

APR 12 1941

MOTOR AGE

FOR AUTOMOTIVE SERVICEMEN

A CHILTON PUBLICATION

APRIL 1941

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Maintenance
Marches On

By Bill Toboldt

1941 Service
Manual

Compiled by
Bob Hankinson

Passenger Car
Tune-up
Specifications
1936-41 inclusive

Truck Tune-up
& Repair Data

And Hundreds of Other
Helpful & Profitable
Ideas



MORE MONEY, MORE MILES, MORE MAINTENANCE

Get The Tools You Want On
Our New Service Tool Plans

Dear Fellas:

Take a good look at those new service tools and sales helps shown below. Think for a minute how they can help build up your ring business, boost your ring profits and give your customers greater satisfaction.

Hastings makes all of these service tools and sales helps available to you.

* * * * * Get set now for greater, more profitable ring business with Hastings Steel-Vent Rings. Ask your jobber salesman to show you the new Hastings Service Tool Plan that fits your needs and gives you the tools you want.

Gently yours,
The Tough Guy



ALL THESE HASTINGS SERVICE TOOLS ARE AVAILABLE



The Hastings Air-Peen Pneumatic Hammer, compact, light, fast and easy to use. The most accurate peening device known as it permits pistons to be peened right in the cylinder. Operates from air compressor. Exclusive with Hastings.



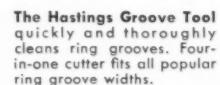
The Tension Indicating Wrench prevents cylinder or block distortion caused by uneven bolting down of cylinder head.



The Corrector Hone is a super-finishing tool used in conjunction with a ridge reamer. It removes high spots, variations and glaze from upper cylinder bore.



The Safe-T-Blade Ridge Reamer removes the ridge above the ring travel in worn cylinders, preventing serious damage to the top ring, which can cause blow-by and clicking noise in the motor.



The Hastings Groove Tool quickly and thoroughly cleans ring grooves. Four-in-one cutter fits all popular ring groove widths.



The Compression Tester helps sell the car owner an overhaul job without removing the cylinder head, by showing the unbalanced condition of the motor.



The Taper Gage shows the car owner the degree of taper in the cylinders—assists you in selling a ring installation.



The Oil Bearing Leak Detector, an ingeniously simple tool for discovering and demonstrating the need for bearing replacement.

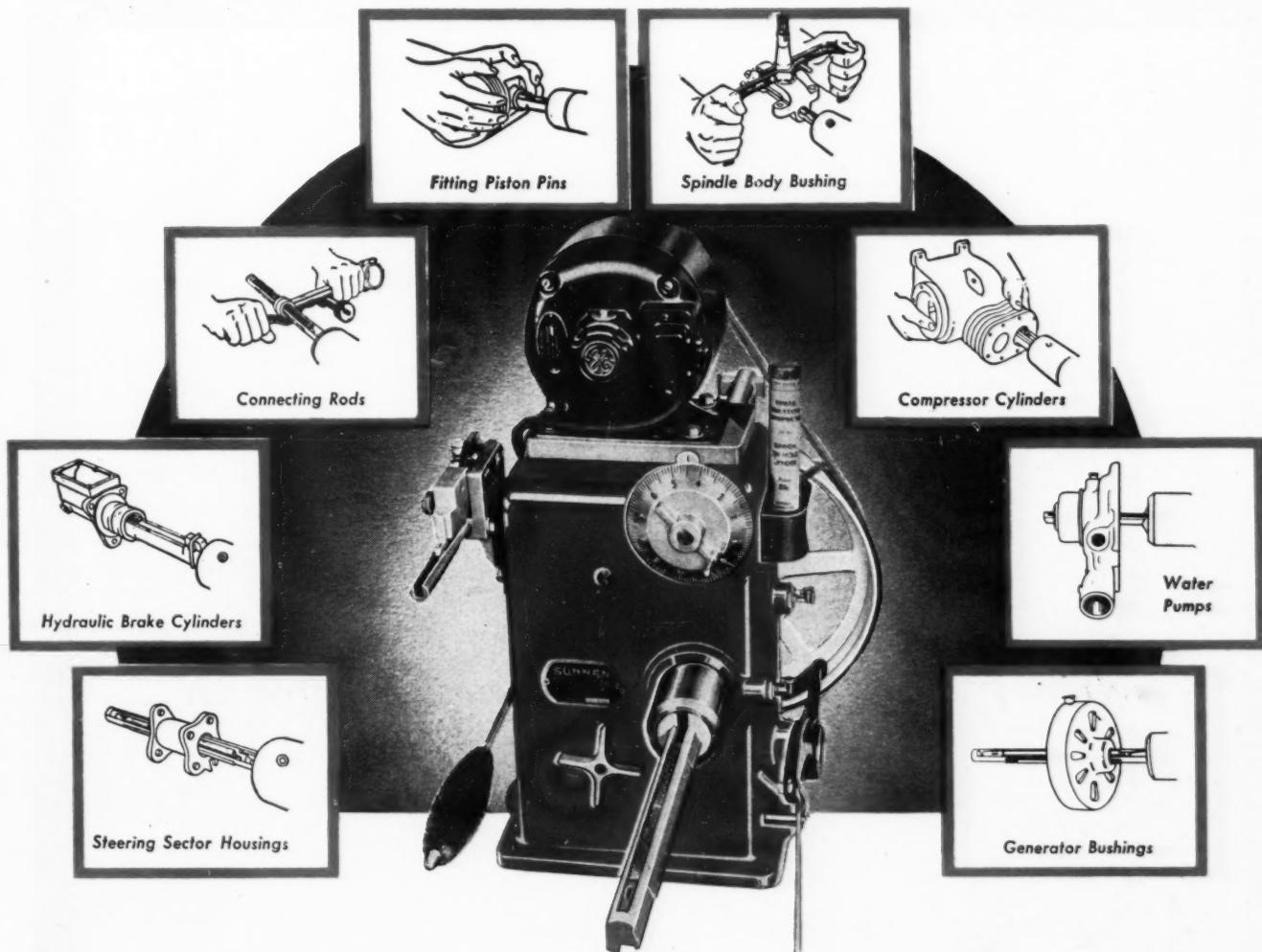
HASTINGS MANUFACTURING CO., HASTINGS, MICHIGAN • Piston Rings • Piston Expanders • Valv-Rings

HASTINGS

STEEL-VENT PISTON RINGS

U. S. Patent Nos. 2,148,997, 2,175,409

Stop Oil-Pumping • Check Cylinder Wear



Biggest Money Maker in Our Shop Say Many Owners of the Sunnen Bushing Grinder

Before you invest your money in a piece of equipment ask yourself these two questions — "How much money will it make for me?" and "How will it help me to build a bigger and better business?"

Our files are crammed with letters from enthusiastic owners saying, "the Sunnen Bushing Grinder is the biggest money maker in our shop."

Our figures show that an investment of \$9.19 a month will produce an average of \$34 per month.

Swell, you say — but will it do the same for me? You can find out easily and quickly! Just send for a free copy of the Sunnen "Proof" sheet — it will show you exactly what this equipment will produce for you based on your present averages. Then bear in mind that the Bushing Grinder produces added labor sales and parts profits by greatly increasing the number of services you can offer your customers.

And remember — your Sunnen jobber will install a Bushing Grinder in your shop on 30 days FREE TRIAL. You can't lose — so write for that "Proof" sheet today!

SUNNEN PRODUCTS COMPANY

7910 Manchester Avenue, St. Louis, Missouri

Chatham, Ontario

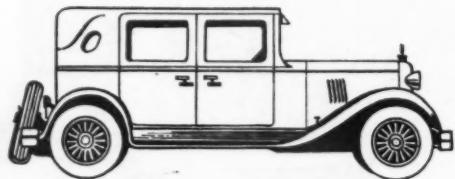
SUNNEN

Bushing Grinder • Crankshaft Grinder • Cylinder Grinder • Service Tools

Sunnen "LB" Two-Speed Bushing Grinder

Grinds and finishes any hole from .365" to 2.400" and up to 7" in length. Produces full bearing surface free from high spots, chatter marks or bell mouthed; assures perfect alignment between bosses. Accuracy within one ten-thousandth guaranteed. Fast; no blade to get dull; no missing sizes. Complete with stones and mandrels to handle range of .720" to 1.020".

\$14800



*Cars looked like this
when Pan American Airways Began
to use Wolf's Head*



12 years of exclusive use—by Pan American Airways—the world's largest international air transport company—speaks for itself as a tribute to Wolf's Head quality.

Wolf's Head proven performance means extra protection for the cars you service—an extra safeguard against unexpected upkeep costs. That is why

Wolf's Head alone can guarantee the car-buyer against repair bills on lubricated parts during the first 30,000 miles.

This Guarantee has no equal as an aid in closing new car sales—and in bringing customers back for regular service. If you are not already completely informed about the Wolf's Head Guarantee, write today to Wolf's Head Oil Refining Co. at Oil City, Pa. or New York, N. Y.

→ **WOLF'S HEAD** ←
MOTOR OIL and LUBES
P. G. C. O. A. #19
35c a quart • 100% Pennsylvania

Triple Action

AVOID DOUBLE WORK ON TUNE-
UP JOBS BY USING PERMATEX
**TOON-OYL BEFORE MAKING
MECHANICAL ADJUSTMENTS**



FIRST — Add Permatex Toon-Oyl to the crank case oil to free sticky valves and piston rings.

SECOND — After the motor has been cleaned of carbon-gum, make necessary mechanical adjustments.

THIRD — Continue the use of Permatex Toon-Oyl to keep motor running at highest efficiency.

Permatex Toon-Oyl does its job so well because it forms no acid, forms no sludge, is a fine lubricant and has a film strength in excess of 30,000 pounds per square inch.

Use Permatex Toon-Oyl for breaking in new and rebuilt motors. Add 1 quart to 5 or 6 quarts of motor oil in crankcase.



PERMATEX COMPANY, INC., SHEEPSHEAD BAY, N. Y., U. S. A.

CHAMPION
PATENTED

"You Can't Beat

FOR

The eye-compelling poster shown below will tie up your place of business with National Spark Plug Change Week. Obtain them from your Champion salesman or jobber. The key advertisement below and at the right will appear in 7 national magazines, 9 farm publications and in 63 newspapers in rotogravure — circulation 41,240,613.



It's Spring! Time for the open road
Time for new Champion
SPARK PLUGS



National Spark Plug Change Week May 5 to 11

Now is THE TIME, and here is the way, to correct sluggishness, poor gas mileage and poor engine performance in your car—have your spark plugs checked and cleaned by a Champion Spark Plug dealer. In fact, more than 10,000,000 miles or more have new Champion installed.

National Spark Plug Change Week now serves as an annual reminder to hundreds of thousands of automobile owners that spark plugs which do 10,000 miles actually save them money, and at the same time revitalize the performance of their engines.

Champion Spark Plug dealers offer special spark plug service during Change Week. This includes testing, cleaning and adjusting—services which enable you personally to see whether new spark plugs are needed.

When you buy spark plugs demand Champions because no other spark plugs give the same championship performance which has made them the choice of the champion. And because Champion spark plugs have the patented Silmet seal which keeps Champion free from troublesome gas or compression leakage once it is installed.

This kind of dependability alone makes Champion your logical choice if you want the performance your high-compression engine and today's modern auto-kid demands.

There is a Champion dealer near you who displays the familiar Champion "bow-tie" sign which is the sign of dependable service. Have him revitalize your engine today!

The Sign of Dependable Service

CHAMPION

Spark Plugs

HERE'S THE
CHAMPION
FOR
YOUR CAR

CHAMPIONS PROFIT OPPORTUNITIES?

REASON #4
NATIONAL
SPARK PLUG
CHANGE WEEK

MAY 5TH-11TH

Says—
CHAMPION'S
R. M. WARD



NOW is the time for all good Champion Spark Plug Dealers to prepare for the biggest profit opportunity of the year—National Spark Plug Change Week—May 5th-11th. With a 17-year record of success, the 1941 Change Week promises to exceed all others in volume and profits.

In order to pre-sell your customers on changing spark plugs, Champion will make use of a large list of national magazines, farm papers and rotogravure sections of newspapers—each and every advertisement bearing down on the theme “You’re Always Ahead With Champions” and urging all motorists to change spark plugs.

In order to prepare for this big volume

week, you should check your stock of Champions now. Make sure that you have an adequate stock to take care of all orders. Arrange an attractive window display with the help of our new window poster and other display material. Make full use of your new Super Sales Service Unit for this equipment has proved invaluable in making sales.

Champion will do its part to pre-sell your customers on changing plugs during Change Week and if you’ll do yours, you’ll find that “You’re Always Ahead With Champions”—both in volume and in profits.



Your best spark plug salesman. Tests and cleans all makes of spark plugs—a complete spark plug department in one compact unit.

IT PAYS YOU WELL TO STOCK AND SELL—CHAMPIONS

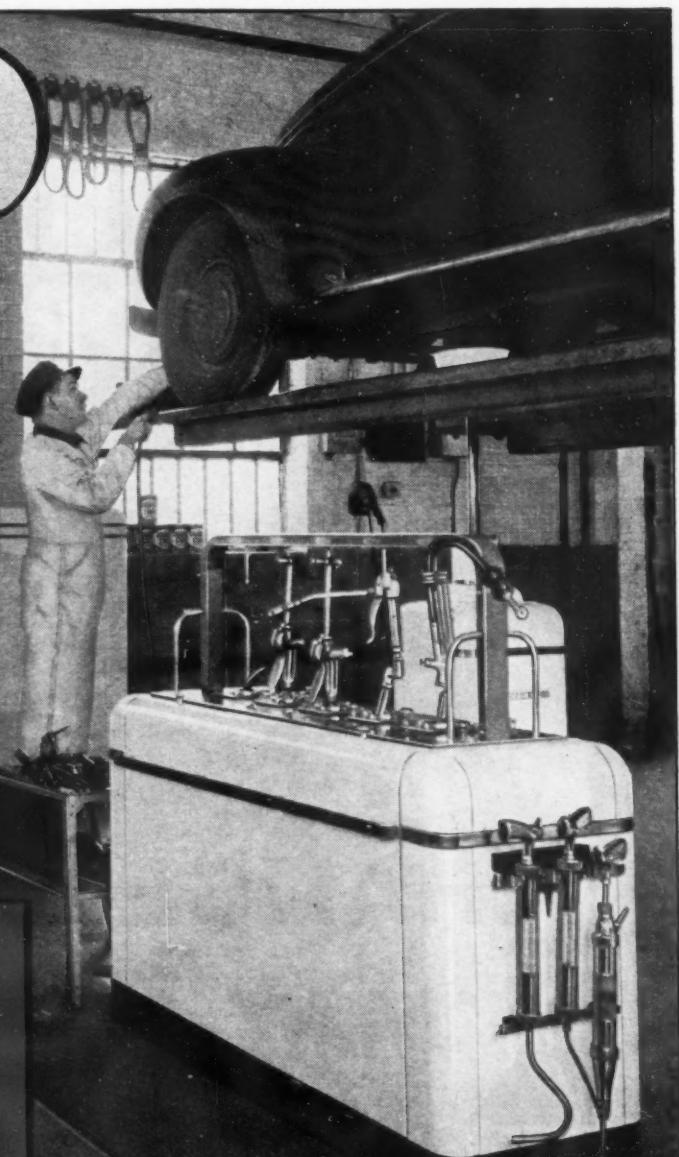
**REPEAT ORDERS
PROVE MERIT**

LINCOLN

**LUBRICATING EQUIPMENT
*Is the choice of those
who know from experience***

Guy Bush, a well known Chicago service station operator, was one of the first to buy Lincoln Lubricating Equipment many years ago. Now his new super service station (illustrated), is again equipped with Lincoln. Hundreds of repeat orders like this prove more than words, the merit of Lincoln Lubricating Equipment.

Lincoln manufactures a complete line of modern equipment, and you will find it easy to make a selection suited to your needs. For example, consider the installation shown above. The Lincoln Compartment-Type Wall Battery is designed for installation against the wall, and because of its attractive appearance, it arouses customer interest



Courtesy Guy Bush Super Service Station 1039 Foster Ave., Chicago, Ill.

instantly—and the efficiency of the equipment wins customer satisfaction.

The Lubrel (illustrated) provides the simplest method of grouping all delivery hose—chassis, gear lubricant, motor oil, air and water—at a central point where each hose is concealed and out of the way when not in use.

All Lincoln units embody the very latest developments in utility of design and beauty of style... For details on the complete line—get in touch with your nearest Lincoln jobber, or write us for Catalog No. 53.

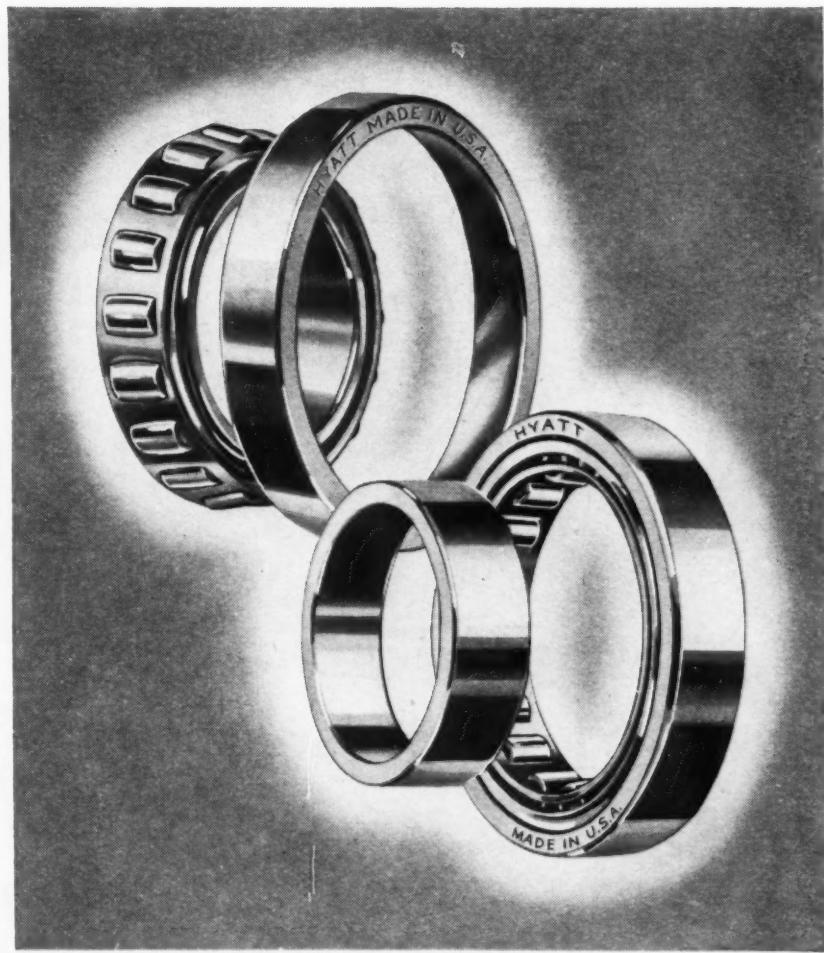


LINCOLN ENGINEERING COMPANY

Pioneer Builders of Engineered Lubricating Equipment

ST. LOUIS, MO., U. S. A.

**PLAY SAFE!
REPLACE
WITH
GENUINE
HYATTS!**



KEEP THEM YOUNG WITH HYATTS, says Rollo, when it's time to make Hyatt replacements. The leading car and truck builders originally install these quality bearings for their particular design and application advantages. That's why it always pays to use only genuine Hyatts for service, too. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, N. J., and Detroit, Michigan.

Through United Motors Service
genuine Hyatt Quiet Roller
Bearings for replacement are
available everywhere.



R O L L E R B E A R I N G S

Q U I E T

AVAILABLE

**1 Cleaner—Brighter—Longer
Lasting Colors**

**2 Dependable
Quality**

**3 Easier
Application**



APPROVED

**AUTOMOTIVE
FINISHES**

MADE BY

DITZLER

EVERWHERE

Your NEAREST
DITZLER JOBBER

Is Only A Few Miles Away

Car dealers—used car merchandisers—fleet operators—*everyone* who owns or operates a paint shop will find a big advantage in Ditzler Finishes and Services for 1941. Better color matches, uniform quality and easy application assure greater satisfaction and worthwhile economy.

Car and commercial vehicle manufacturers, as well as paint shop

operators have placed their "stamp of approval" on Ditzler Products. They are scientifically built by paint experts. 39 years of experience go into their making. Every product in the Ditzler line is made to uphold the Ditzler reputation.

Ask your Ditzler jobber about the new Two Tone color chips. Make color identification easier on the new models.

DITZLER COLOR COMPANY • DETROIT, MICHIGAN

STANDARD IN THE AUTOMOTIVE
INDUSTRY SINCE 1902

Reads just
like an ad...

ROCK ISLAND RAMSES
Rock Island, Illinois
Entered First Class Mail
Postage Paid Rock Island 1935

SCHWIND POPPLEWELL, INC.
DODGE MOTOR CARS
DODGE TRUCKS
PLYMOUTH MOTOR CARS

March 10, 1941

Mr. F.H. Akers, Vice-President
Dodge Division, Chrysler Corporation
Detroit, Michigan

Dear Mr. Akers:

I thought you would like to know that our outlook for spring and summer business is splendid. We expect to show a substantial increase over the same period of last year.

This may seem like an old story to you, because ever since we took on the Dodge-Plymouth Dealership, our outlook has always been bright. When we started with you in 1927, it didn't take long to realize that with our three great lines... Dodge and Plymouth cars and Dodge trucks... practically every car owner and every prospect for us.

That's the way it has been for over 14 years. We do business in the price field where people buy all the time, and we get the constant floor play stimulated by three separate advertising campaigns. Through good years and bad, there is always a plentiful volume available in the Dodge-Plymouth range. It is really gratifying to look back on past seasons and to reflect that our dealership has yielded a nice profit year after year.

With best wishes for 1941,

Yours sincerely,
Schwind Popplewell Inc.

KP Popplewell



CONSISTENT profits over a period of years... and immediate prospects brighter than ever! Here is another example. And this story is being duplicated in hundreds and hundreds of communities. That's what makes the Dodge-Plymouth Dealership the No. 1 opportunity in the industry.

WHY NOT get our proposition? Dodge requirements are not difficult. Any sound business man has the qualities necessary for success with this dealership. A confidential note to Forest H. Akers, Vice-President, Dodge Division, Chrysler Corporation, Detroit, will bring you the facts.

The Triple-Profit Dealership

DODGE • PLYMOUTH • DODGE Job-Rated TRUCKS

KOETHERIZE



FOR PISTON
PERMANENCY

KOETHERIZING

KOETHERIZING

KOETHERIZING

KOETHERIZING

KOETHERIZING

KOETHERIZING

— is accepted as the most effective method of correcting piston skirt collapse.

— has resized millions of pistons . . . made them better than new.

— saves the cost of new pistons by restoring pistons to original factory fit.

— is a national field service, designed by the makers of American Hammered Piston Rings, available through more than six hundred leading jobbers.

— is the one process that makes any ring job a better job.



Every pulled piston should be Koetherized

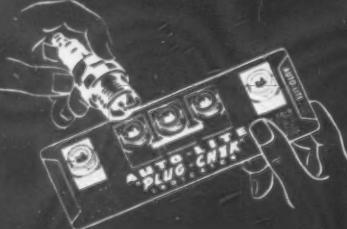
KOPPERS COMPANY

American Hammered Piston Ring Division
BALTIMORE, MD.



LAUNCH YOUR AUTO-LITE'S NEW

**EXCLUSIVE 5 POINT PLAN
MOVES PLUGS FAST!**



OPERATION



HEAT RANGE



CLEANING



REGAPPING



INSTALLATION

CHECK ENGINE PERFORMANCE

—Simply match the "business end" of the spark plug with the examples on the "Plug-Chek" Indicator. Helps you spot, more easily than ever before plugs functioning improperly, or plugs burned or fouled because of engine irregularities.

REPLACE WITH CORRECT PLUGS

—Thousands of owners have replaced with wrong type plugs and don't know it. A "Plug-Chek," plus the Heat Range Chart, helps you show them what's wrong; enables you to supply correct plugs for the job. Builds business.

CLEAN DIRTY PLUGS—You can clean plugs faster with the Auto-Lite Ziramic Spark Plug Cleaner, the only cleaner that cleans all sizes of plugs without adjustment. But cleaning is just one phase of restoring "like-new" performance. "Plug-Chek" helps do the *complete* job.

REGAP ELECTRODES—Spark plug gaps require periodic adjustment because of normal wear. After cleaning, gaps should always be checked and reset, if necessary. Adjustment is simple and accurate with the Auto-Lite Gap Gauge. You do the job better and faster.

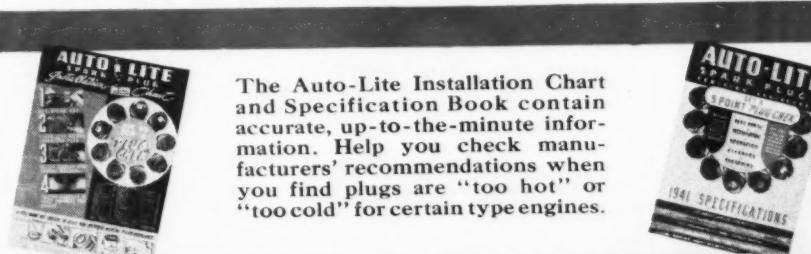
PROPER INSTALLATION KEY TO PERFORMANCE

—Only by correct seating, with a socket wrench, can you eliminate leaks and, just as important, insure the proper rate of heat transfer. Always use new gaskets when replacing plugs in any engine.

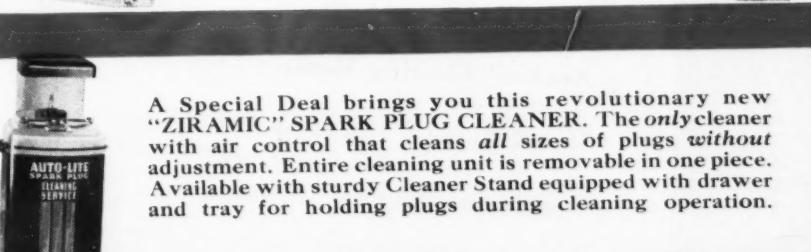
SPRING DRIVE WITH "PLUG-CHEK" PROGRAM!



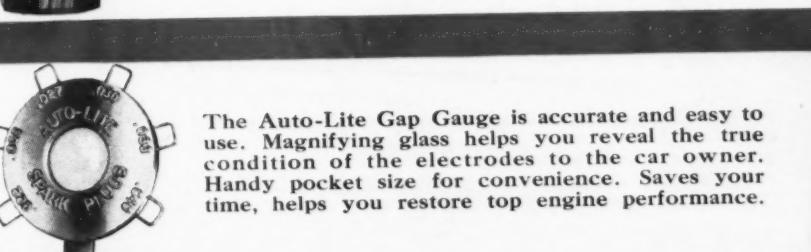
The "Plug-Chek" Indicator, when used with the "Plug-Chek" Data Book, helps spot plugs not functioning properly. Shows when to look for mechanical trouble—helps specify correct type plugs.



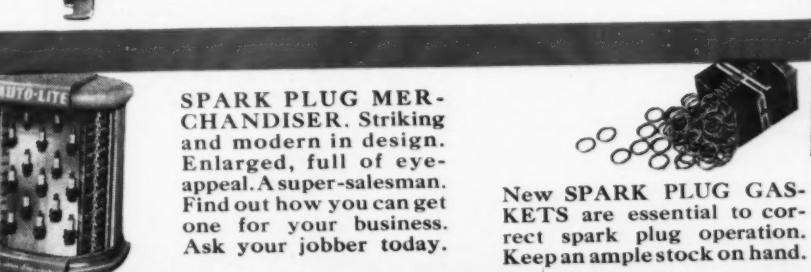
The Auto-Lite Installation Chart and Specification Book contain accurate, up-to-the-minute information. Help you check manufacturers' recommendations when you find plugs are "too hot" or "too cold" for certain type engines.



A Special Deal brings you this revolutionary new "ZIRAMIC" SPARK PLUG CLEANER. The only cleaner with air control that cleans all sizes of plugs without adjustment. Entire cleaning unit is removable in one piece. Available with sturdy Cleaner Stand equipped with drawer and tray for holding plugs during cleaning operation.



The Auto-Lite Gap Gauge is accurate and easy to use. Magnifying glass helps you reveal the true condition of the electrodes to the car owner. Handy pocket size for convenience. Saves your time, helps you restore top engine performance.



SPARK PLUG MERCHANDISER. Striking and modern in design. Enlarged, full of eye-appeal. A super-salesman. Find out how you can get one for your business. Ask your jobber today.



New SPARK PLUG GAS-KETS are essential to correct spark plug operation. Keep an ample stock on hand.

Here's how
AUTO-LITE
backs "Plug-Chek"

Color Pages in Leading
National Publications
reach 73,000,000!

...plus
Billboards Coast-to-Coast
"Parade of Stars"
Wrapper Plan

...and
Point-of-sale material
that makes your place
of business "Plug-Chek" Headquarters.

The big push behind "Plug-Chek" is now in full swing in national magazines, farm publications, billboards, newspapers. Get the details from your jobber or write Merchandising Division, The Electric Auto-Lite Company, Toledo, Ohio.



Auto-Lite Spark Plugs are equipment on one out of every four new cars built.

AUTO-LITE SPARK PLUGS



HOW TO INCREASE SALES, PROFITS, PRESTIGE

FEATURE and display the new Sinko Automatic Cigar Lighter, Replacement Cartridge, and Spin-Ur-Wheel Control. They're packaged in beautiful new cartons and counter displays . . packages that SHOUT . . "Buy me, I'm BETTER!" Rare beauty, finest quality and precision engineering are impressive features of these dependable products. They'll help you get the lion's share of the big, profitable Cigar Lighter and Spin-Ur-Wheel volume.

ORDER NOW . . . OR SEND FOR NEW CATALOG AND PRICE LIST

MOTOR AGE

With Which is Combined AUTOMOBILE TRADE JOURNAL
FOR AUTOMOTIVE SERVICEMEN

Vol. LX, No. 5

April, 1941

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Jos. S. HILDRETH, President and Manager
JULIAN CHASE Vice Pres. **C. C. BUTRY Vice Pres.**

JULIAN CHASE, VICE PRES. G. C. DUBZY, VICE PRES.
Offices: Philadelphia, Phone Sherwood 4244, New York City, 100 E. 42nd St.,
Phone Murray Hill 5-8600; Chicago, Room 916, London Guarantee & Accident
Bldg., Phone Franklin 4243; Detroit, 1015 Stephenson Bldg., Phone Madison 2090;
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One Spring's Enough!

. . . And if pistons could talk they, too, would say,
"One spring's enough."

No longer do you need more than one spring per piston to stop oil pumping . . . if it's TRIPLE ACTION. No longer do you need accept the piston drag and lazy performance caused by using more than one spring. With Triple Action, the dangers of excessive wear caused by high ring pressures are gone! . . . That's why engineers, mechanics, and owners are going for Perfect Circle Triple Action Sets in a big way. They like the savings on gasoline and oil without sacrificing power, pickup, and pep.



Perfect Circle
Triple Action **PISTON RINGS**



THE PERFECT CIRCLE COMPANIES, HAGERSTOWN, INDIANA, U. S. A. AND TORONTO, CANADA

AIR COOLED



ALWAYS DEPENDABLE FOR SEVERE SERVICE

Car dealers everywhere are discovering that BLUE CROWN'S exceptional heat range makes BLUE CROWN air-cooled spark plugs their best bet for replacements on late model Chevrolet, Ford, Plymouth, Dodge, Chrysler and other cars. Mechanically, BLUE CROWN air cooling, catalyzed electrodes, "Poranite" insulation and other advanced engineering features insure dependable service under the severest conditions . . . Yet the dealer buys BLUE CROWNS at a price which enables him to make 10c in extra profit on every plug he sells.

MOTOR MASTER PRODUCTS CORP.
4757 NORTH RAVENSWOOD AVENUE, CHICAGO, ILLINOIS

PORCELAIN
SPARK PLUGS
FOR AIRPLANES

MINIATURE
SPARK PLUGS
FOR MODEL AIRPLANES/
BOATS and CARS

BLUE CROWN

Exclusive EXPORT
DISTRIBUTOR

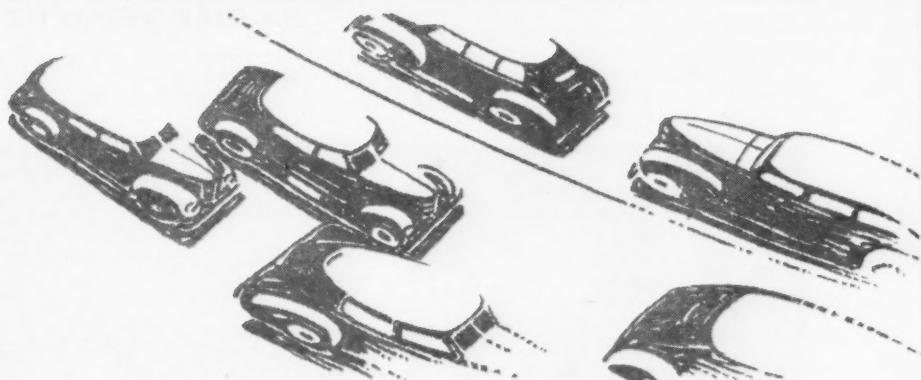
Air Cooled
SPARK PLUGS

BORG WARNER INTERNATIONAL CORPORATION
310 S. Michigan Ave. Cable Address, BORINTCO Chicago, III.



MOTOR AGE

A P R I L 1 9 4 1



MAINTENANCE Marches On! One far reaching result of the National Defense Program will be a marked increase in automotive maintenance of all types. As more men become employed and ride back and forth to work, their cars will require more service, parts and accessories in order to keep them in safe and economical running condition. If new car production is limited (as many expect) maintenance will be still further increased because car owners will be forced to continue rolling up miles on their present cars.

This increase in automotive maintenance business will present many difficult problems because so many mechanics are entering the armed forces. Such men are being replaced

by young, inexperienced men, recently graduated from vocational training schools. Such men will require a lot of additional training, and both trained and untrained mechanics will need the instructions and reference material contained in this special issue of MOTOR AGE. In addition, service managers will find it necessary to study ways and means of turning out more jobs in less time, which can only be done by careful planning and extensive use of time-saving equipment. In regards to equipment, it must be remembered that production of equipment and tools is already far behind demand because priority has been given the urgent needs of Army and Navy and certain items can no longer be obtained by the trade.

CHECK-LIST FOR SPRING SERVICE



Check these 24 points to insure Safety, Performance and Economy

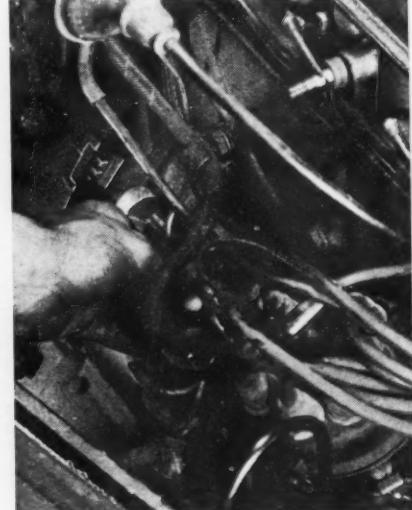
By BILL TOBOLDT



Valve tappet adjustment is one of the most important steps in the engine tune-up job. Loss of power and burned valves eliminated.



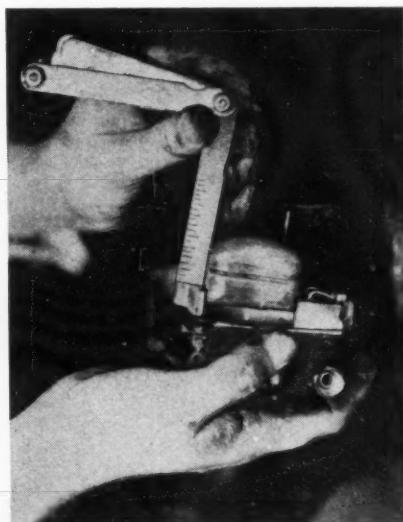
Cleaning points and setting breaker point gap. Pitted or burned points should be replaced to insure proper performance.



Timing the ignition requires extreme care. Use a timing light and set the spark with the engine running. Check road performance.



Clean and test all spark plugs. Replace all plugs that have had 10,000 miles of service, for improved gasoline economy and pep.



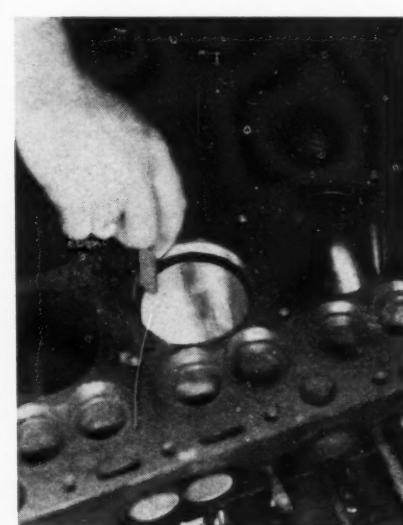
Check and set carburetor float level. Hard starting and excessive gasoline consumption can be traced to improper float level.



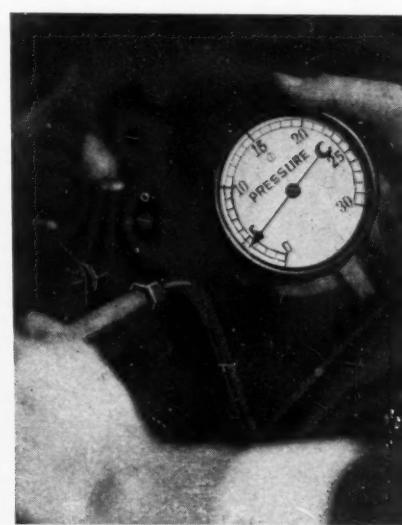
Adjust the carburetor idle screw for summer driving. Replacing idle screws that have been jammed into the seat is recommended.



Use a vacuum gage to check engine performance. It will show up poorly seating valves, worn rings. Assists in proper carburetor setting.



Install new piston rings to restore normal compression, eliminate excessive oil consumption and improve performance and economy. Check cylinder walls for wear.



Check the fuel pump pressure. This will show need for new diaphragm or for complete overhaul or replacement. Exchange for rebuilt unit.



Winter is tough on batteries and all should be checked for charge or need for replacement. Also check cables.

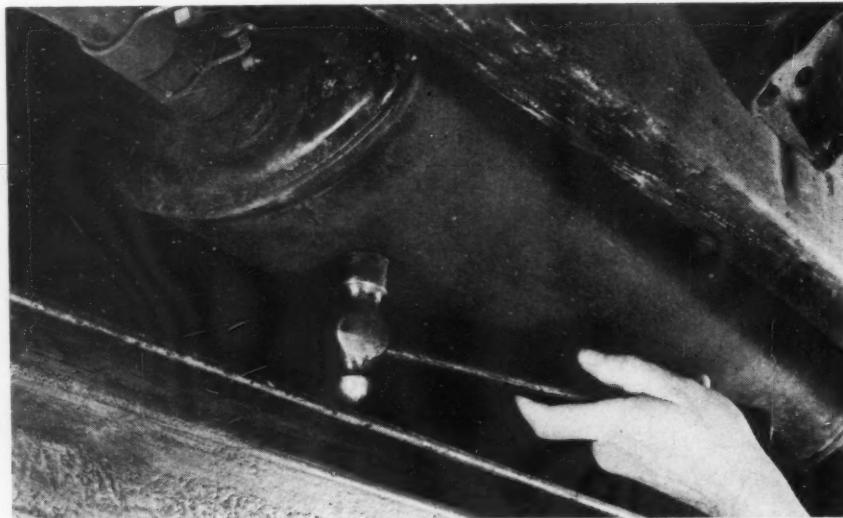


Test the starting circuit and the generator circuit. Adjust the voltage regulator for proper control for summer driving conditions.



Examine the ignition wires for cracks in the insulation, and replace where needed. New wires and new spark plugs restore pep.

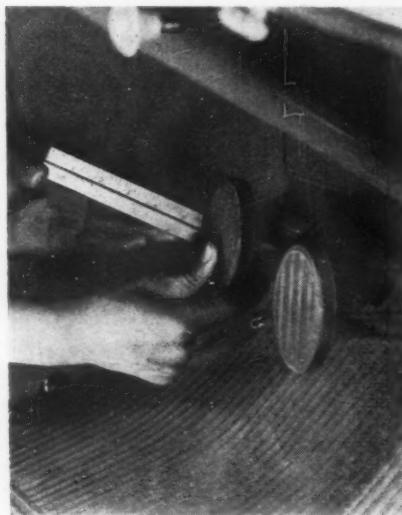
CHECK-LIST FOR SPRING SERVICE



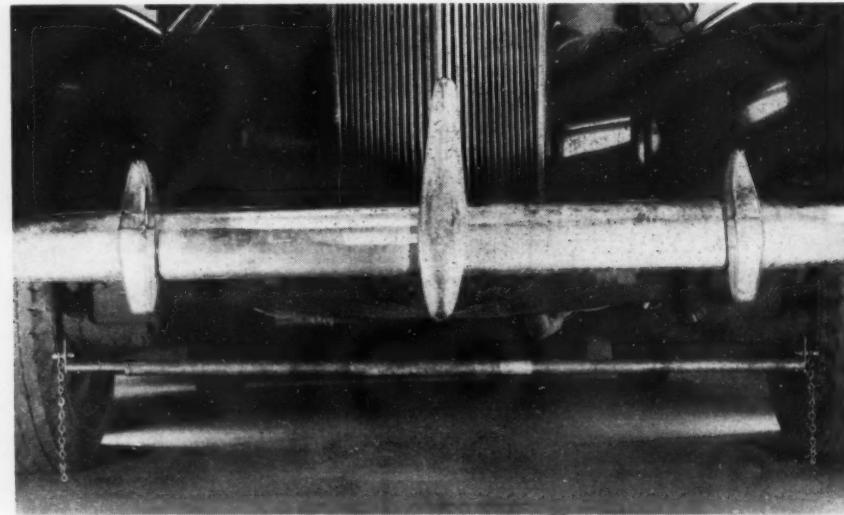
Get the car up on the lift and inspect the muffler. Condensation during the winter has probably caused it to rust and become unsafe. Replace with a new muffler for safety. Examine underneath the car for oil leaks, worn brake hose, damaged gas tanks, etc.



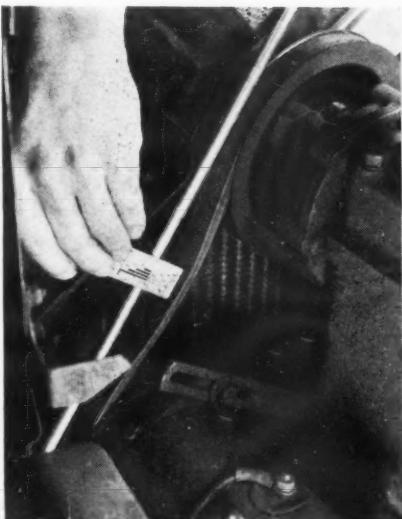
Adjust the steering gear according to specifications, for safety. Inspect tie rod ends for wear, and replace when necessary.



Adjust the clutch pedal free play. Test for slipping or grabbing clutch, check linkage for wear. Replace worn pedal pads and mats.



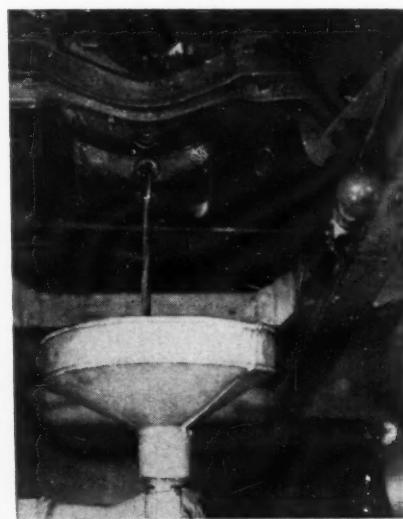
Check wheel alignment—caster, camber and toe-in. Examine for play in king pins, tie rod and drag link sockets. Check for misaligned frame. Check and refill shock absorbers. Examine springs and spring shackles for worn bolts, broken spring center bolts. Repack covers.



Adjust the fan belt, replacing worn belts. Check the water pump shaft for end play and examine the water pump for leaks. Replace water hose.



Flush the cooling system, flushing in reverse direction to normal flow. Flush the radiator and block separately, and install rust inhibitor. Check cooling system for leaks.



Drain oil, flush engine and refill with summer grade lubricant. Drain and flush transmission and rear axle. Check steering gear lubricant. Complete chassis lubrication.



Tighten body bolts, spring clips and shackles. Eliminate all body squeaks and rattles, align doors. Clean upholstery. Install seat covers.



Pull a wheel and examine brake lining. Inspect brake hose. Flush hydraulic brake system and install new master cylinder and wheel cylinder parts where necessary. Examine brake drums for score marks and for being out of round. Adjust foot brakes and hand brake.



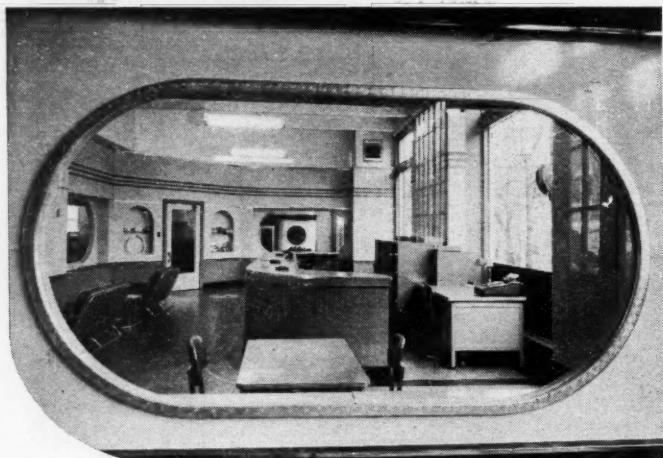
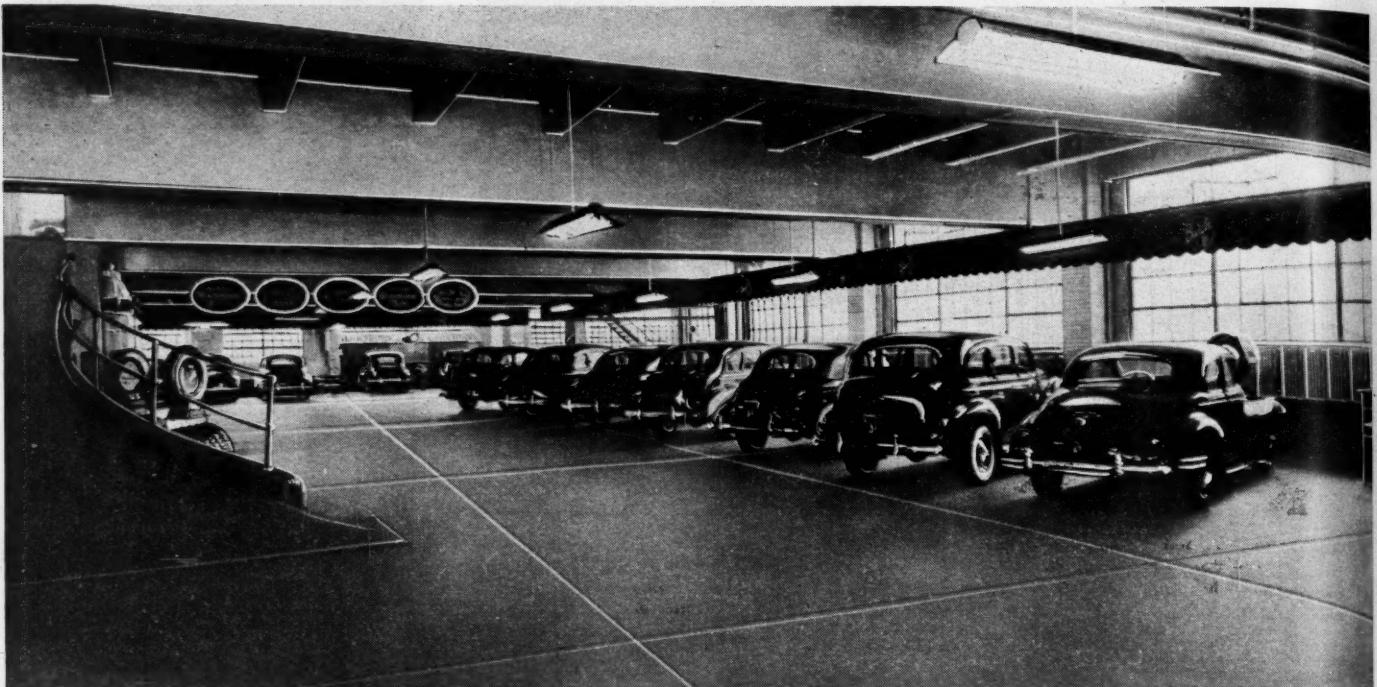
Examine tires for curb bruises, cuts or shoulder breaks. Replace old tires that are unsafe, and regroove tires with worn tread.



Examine fenders for dents and scratches. Remove dents and refinish. Touch up body where needed, and replace damaged hub caps.



Examine windshield wiper blade and replace worn blades. Check operation of wiper and replace scratched windshield glass.



EQUIPPED FOR THE

An outstanding shop modernizes to boost earnings further •

A WELL-EQUIPPED shop earns a healthy share of the overhead. Davis Buick Company, Philadelphia, proves this consistently. Last year the service department of that car dealership paid 78 per cent of the entire overhead, including new car operations. This better-than-average service income might have prompted others

to let well-enough alone. At Davis Buick, however, it only served to show the way to greater income possibilities.

In 1940, Davis Buick servicemen handled 13,000 cash-on-the-line service orders and earned \$70,000 in customer labor on a gross income of nearly \$150,000.

The management of Davis Buick,

Charles H. Davis, proprietor, Edward H. Bauer, general manager and J. J. Agger, service manager, studied their figures and studied the trend toward super service . . . then decided to spend more money for new income earning equipment, new tools, modernization and departmentalization—to the tune of a \$20,000 investment.



FUTURE

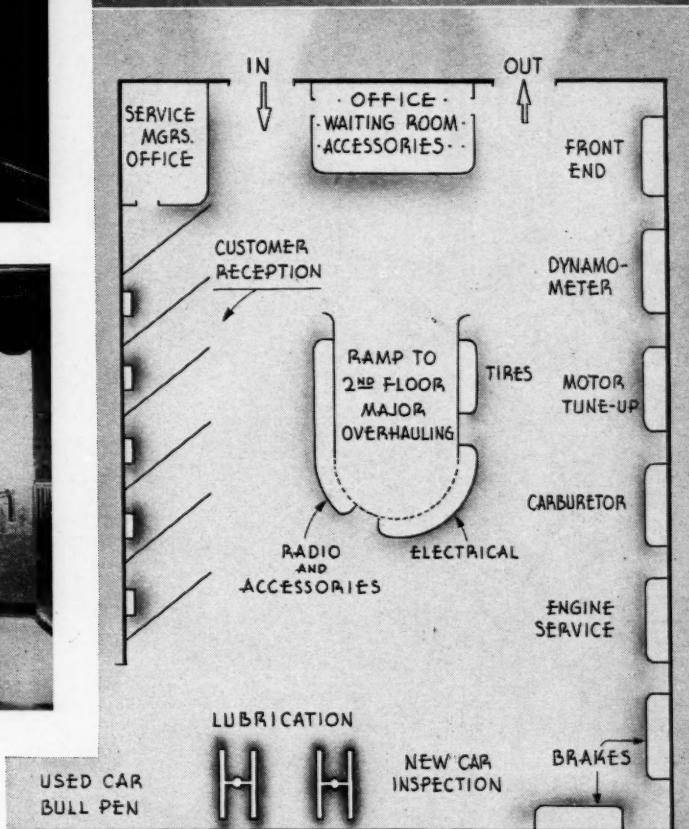
• • By FRANK TIGHE

What was a modern, well-equipped service department has been renovated, remodeled and re-equipped entirely in keeping with the super service trend. All quick services are performed on the first floor of the two-story service building. Each floor offers 27,500 feet of working floor space.

(Continued on page 76)

THE SERVICE DEPARTMENT OF TOMORROW

Here's a pictorial round-up of some of the highlights in the Davis Buick service station of tomorrow. Every quick service is departmentalized; every department has its own tools, parts and equipment in individual, porcelain-enameled display cabinets. Floor plan is shown below.

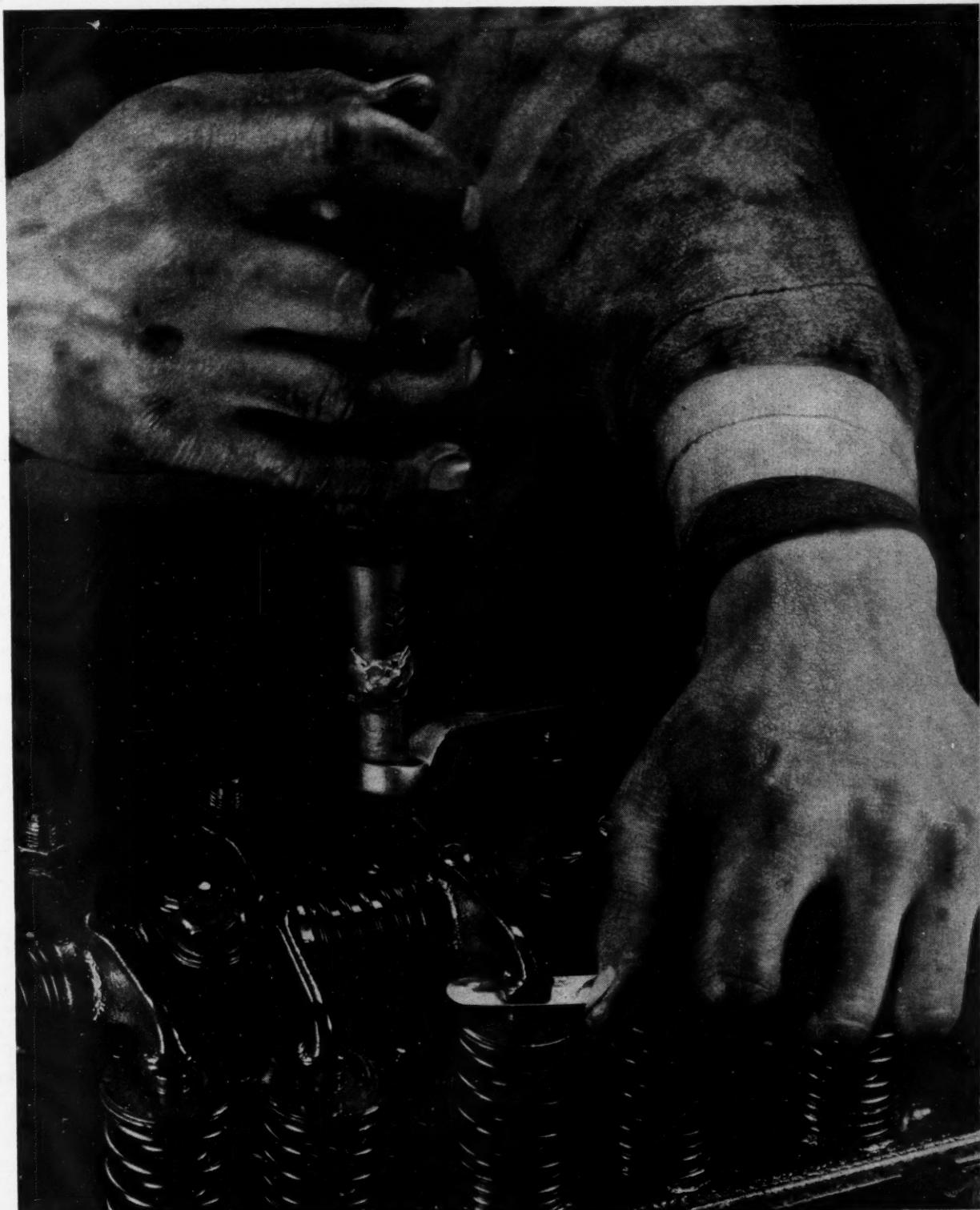




"Since I added glamour to my service station—my customers' wives won't let 'em stop here any more!"

MOTOR AGE

1941 SERVICE MANUAL



COMPILED BY BOB HANKINSON

40 and 50

Engine

Starting serial number 13880012. Eight cylinder, valve-in-head, 3 3/32 x 4 1/8 in. Displacement 248 cu. in. Maximum brake hp. 115 at 3500 r.p.m. Compression ratio 6.5 to 1. Compression pressure 142 lbs. at 1000 r.p.m. Firing order 1-6-2-5-8-3-7-4. Tighten head bolts to 65-70 ft. lbs. with tension wrench.

Pistons

Aluminum alloy, cam ground, with turbulator top. Installed with hollowed side of piston head toward cam-shaft side of engine. Fit in cylinder to pass of its own weight with 1/2 in. wide feeler ribbon .0015 in. thick, and hold on feeler ribbon .00225 in., with feeler between cylinder wall and thrust side of piston. Removed from above. Supplied for service with pin fitted.

Connecting Rods

Centrifugal cast babbitt bearing, adjusted by removing shims. Rods removed from above. Install in engine with oil spray hole toward cam-shaft side. Tighten bearing cap bolts to 45-50 ft. lbs.

Main Bearings

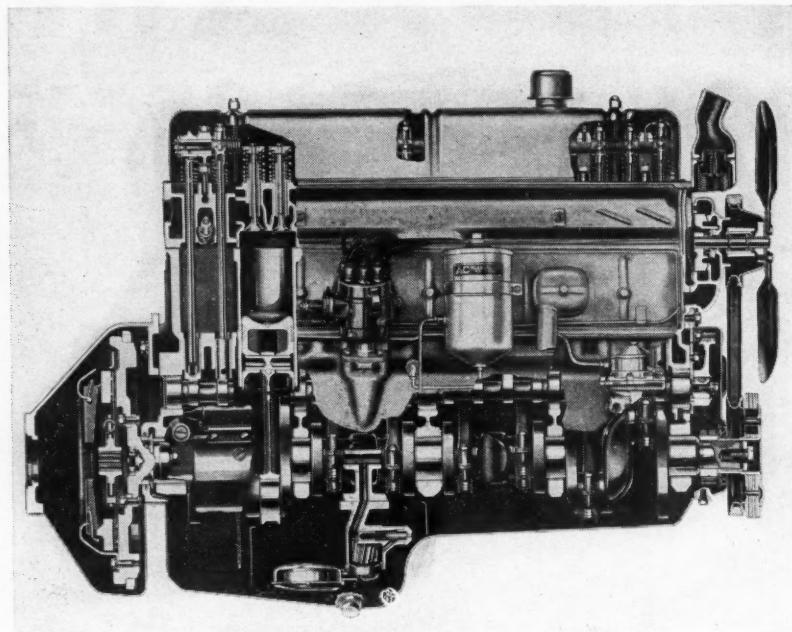
Slip-in type, Durex. Replace in complete sets only. Shells are assembled in case and cap with .000 to .002 in. projection at junction to insure positive contact. Tighten cap screws 115-120 ft. lb.

Ignition Timing

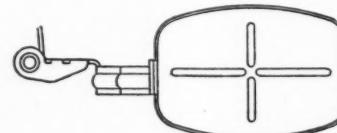
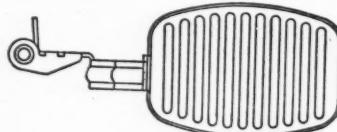
Breaker point gap .015 in. Flywheel marked with 4 deg. advance for use with two carburetors, and 2 deg. advance for use with one carburetor. Time No. 1 cylinder with timing light for spark to occur at proper advance mark on flywheel according to number of carburetors used.

Carburetor

Stromberg AAV-16 or Carter WCD-487S. Idle screw controls gas; turn out for rich mixture, in for lean. Set float level so that fuel level in float bowl is at bottom of threads of inspection hole with engine idling. On Stromberg carburetor this position is



19/32 in. below top surface of float bowl. Carter carburetors use two styles of floats as illustrated. Floats having cross ribs are set by inverting bowl cover and bending float arm to



provide 9/64 in. from machined surface of cover to seam of float. This

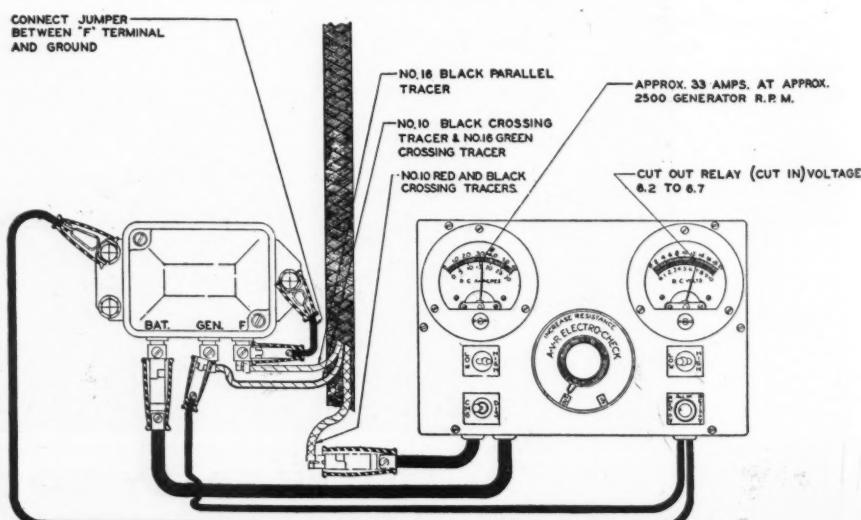
distance should be 3/16 in. if the float has 11 vertical ribs.

Starter Control

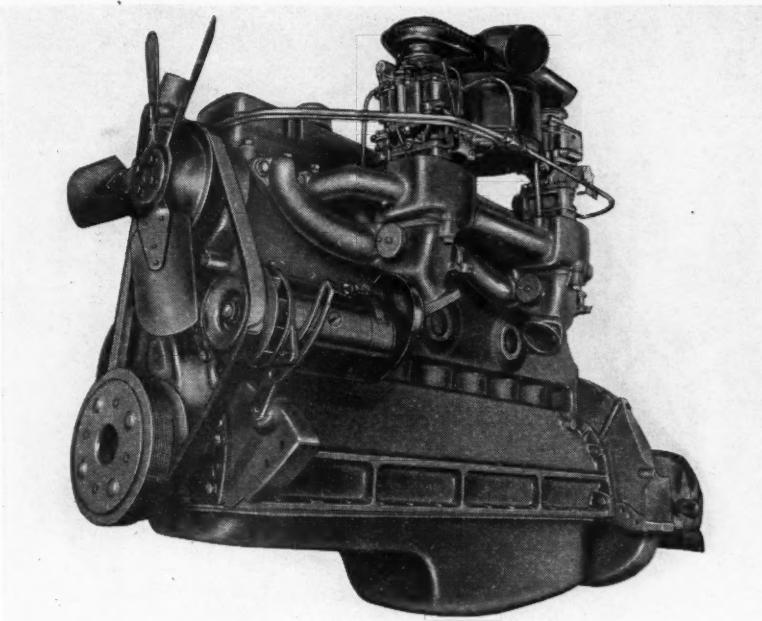
Starting motor Delco-Remy Model 1107005. Operated by accelerator pedal controlling switch on carburetor throttle body, with starter gear operated by solenoid. Solenoid relay point opening .025 to .045 in. Air gap with points closed .010 to .012 in.

Checking Generator Output

Ground the "F" terminal on the regulator. Disconnect battery lead from "BAT" terminal and connect ammeter in series with wire and terminal. Start the engine and gradually increase the speed until the ammeter registers 32 to 34 amperes.



60, 70 and 90

**Engine**

Starting serial number 13880012. Eight cylinder, valve-in-head, 3 7/16 x 4 5/16 in. Displacement 320.2 cu. in. Maximum brake hp. 165 at 3800 r.p.m. Compression ratio 7 to 1. Compression pressure 151 lbs. at 1000 r.p.m. Firing order 1-6-2-5-8-3-7-4. Tighten head bolts to 65-70 ft. lbs.

Pistons

Aluminum alloy, cam ground, with turbulator top. Install in engine with hollowed side of piston head toward camshaft side of engine. Removed from above. Supplied for service with pin already fitted. Fit in cylinder as described for 40 Series.

Piston Rings

Two 3/32 in. compression and two 3/16 in. oil rings per piston. Top compression ring has groove cut at its inner diameter, and this side of ring is to be installed toward top of piston. Second compression ring to be installed with mark "Top" toward top of piston. Oil ring to be installed in third ring groove has narrower wall contact area than the oil ring in the fourth groove.

Connecting Rods

Centrifugal cast babbitt bearing, adjusted by removing shims. When installed in engine, marker on rod and cap should line up and rod should be installed with oil spray hole toward camshaft side. Removed from above. Tighten cap nuts to 60-65 ft. lbs.

Main Bearings

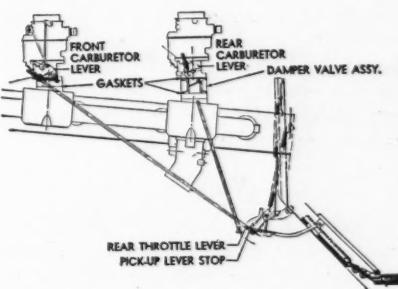
Slip-in type, Durex. Supplied for service only in complete sets. Shims provided for adjustment. Installed in block with from .000 to .002 in. projection above bearing cap and face on crankcase to insure positive contact. Tighten cap nuts to 115-120 ft. lbs.

Carburetor

Stromberg AAV-16 front, AA-1 rear; or Carter WCD-490S front, WCD-491S rear. Both carburetors operate at idle speed, and up to approximately 22 m.p.h. Above that speed, and up to approximately 75 m.p.h. the front carburetor operates

alone except for the idle system of the rear carburetor. Above 75 m.p.h. throttle of rear carburetor starts to open and then the rear carburetor operates equally with the front.

Idle screws control gas—turn out for rich, in for lean. To adjust, back off throttle adjusting screws until throttles are fully closed. Ends of adjusting screws should be set to barely contact thin section of cold idle cam on front carburetor, and throttle body on rear carburetor when throttles are closed. Turn each throttle adjusting screw $\frac{1}{4}$ turn clockwise to open throttles an equal amount. Turn idle adjusting screws in to seats, and back out 1 turn. Start the engine and turn each throttle adjusting screw and each idle adjusting screw the same amount to obtain desired operation, making each turn only about $\frac{1}{8}$ of a revolution. If vacuum



gage is used, set idle adjusting screws so gage will show 1 in. less than maximum reading.

Fuel level information given for Series 40 applies to 60, 70 and 90.

Ignition Timing

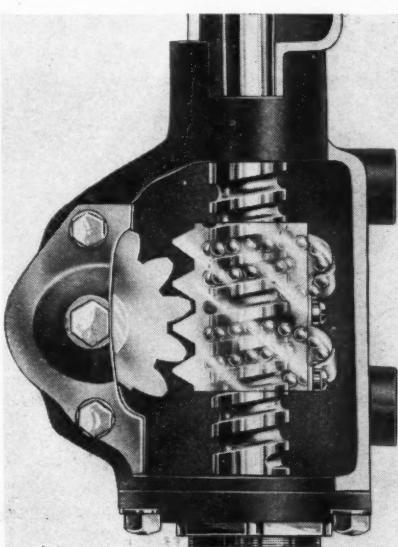
Set breaker point gap at .015 in. Time No. 1 cylinder, using timing light, and adjust distributor so that cylinder fires at 6 deg. advance mark on flywheel, visible through timing hole in right side of flywheel housing.

Spark Plugs

AC Type 104. Gap .025 to .030 in. Tighten to 8 to 10 ft.-lb. pressure.

Distributor

Delco-Remy Model 1110801. Centrifugal advance 22-26 degrees. Vacuum advance 10-12 deg. Breaker point gap .015 in. Breaker arm spring tension 19-23 oz. Cam angle 31 deg.



Engine

Eight cylinder $3\frac{1}{2} \times 4\frac{1}{2}$ in. 346 cu. in. displacement. Taxable hp. 39.2. Brake hp. 150 at 3400 r.p.m. Compression ratio 7.25 to 1. Compression pressure 182 lb. at 1000 r.p.m. Tighten cylinder head bolts to 70 to 75 ft.-lb. tension. Use gasket cement when installing cylinder head gasket. Firing order 1-8-7-3-6-5-4-2.

Pistons

Piston and rod assemblies are removed through the top of the cylinder block. Pistons should be assembled on the rods so that the T-slot is on the left side of the engine. When assembling rods make sure that numbers on rods are toward bottom of machine and are on the same side and correspond to the numbers on the caps.

Main Bearings

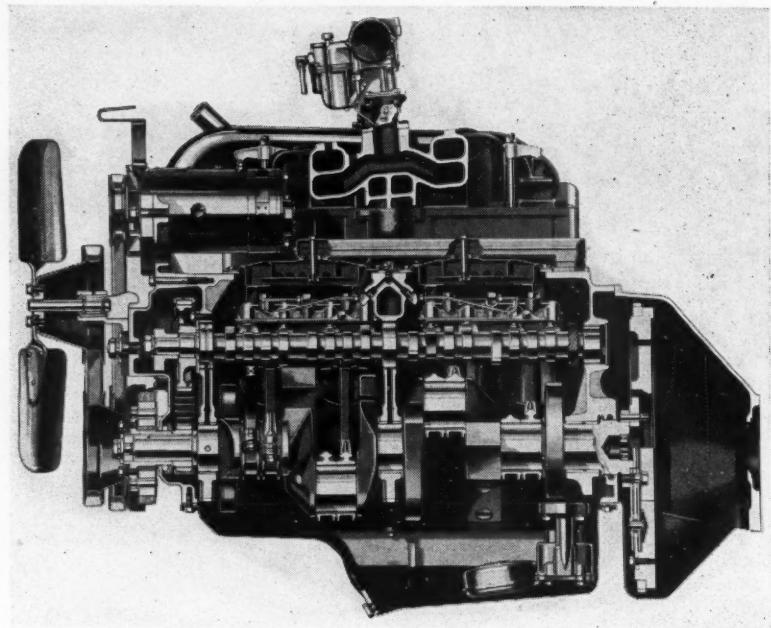
Main and connecting rod bearings are of the steel backed babbitt type. Mains can be replaced without removing the crankshaft. When replacing rear main bearing oil seal it is necessary to remove crankshaft.

Valves

Because of the hydraulic valve lifters it is extremely important to keep the inside of the engine clean. It is therefore necessary to clean the outside of the engine thoroughly before doing any disassembly. It is necessary to remove the valve lifter assemblies before removing the valves. Clearance between valve stems and lifters should be .030 to .070 in. Noisy operation of hydraulic valve lifters may be due to insufficient or too much oil in crankcase; incorrect oil pressure at silencer pipe which should be 3 to 5 lb. when gage on dash reads 12 to 15 lb.; weak valve lifter plunger springs; dirty, scored or worn valve lifter parts. Before installing valve lifters: ball check should rattle when cylinder unit is shaken; plunger should bounce back when pressed quickly into cylinder and released; plunger spring should be locked into cylinder body with twist of plunger; cylinder should slide smoothly into lifter body when free of oil.

Spark Plugs

Standard equipment AC type 104. Correct gap .025 to .030 in.



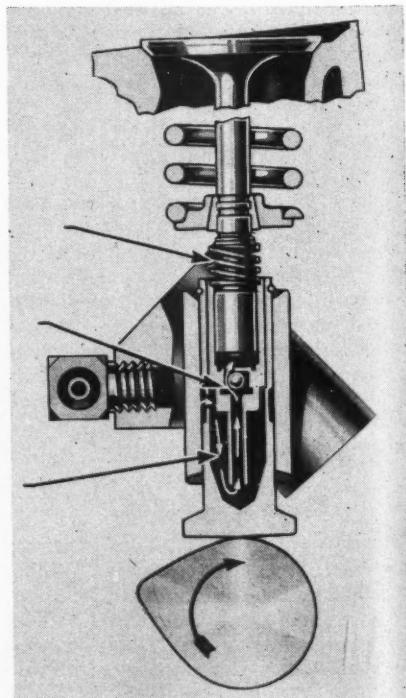
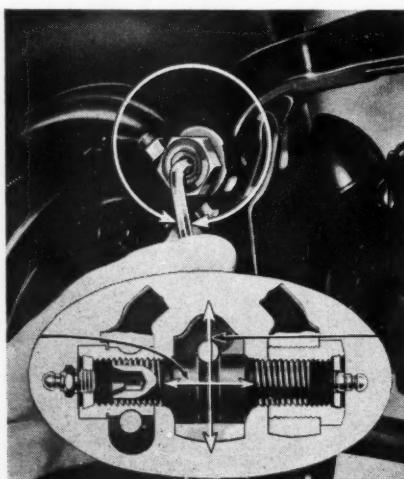
Front Wheel Alignment

Caster minus $1\frac{3}{4}$ to minus $2\frac{3}{4}$ deg. Camber minus $\frac{1}{8}$ to plus $\frac{1}{8}$ deg. Toe-in 1/32 to 3/32 in. Toe-out on turns models 41-61, 62, 63, 60S, with outside wheel set at 20 deg., wheel angle for left hand turn should be 25 deg. 25 min., for right hand turn 24 deg. 42 min. Models 41-67 and 41-75: with outside wheel set at 20 deg. inside wheel for left hand turn should be 24 deg. 7 min., for right hand turn 23 deg. 6 min. Angle between steering knuckle pin and wheel spindle 95 deg. 51 min. Caster and camber adjusted by means of eccentric threaded pin. To adjust, loosen clamp screw at upper end of steering knuckle support. Remove lubrication fitting and insert Allen wrench. Since camber is controlled by eccentric action of threaded pin, $\frac{1}{2}$ turn in either direction gives maximum adjustment for

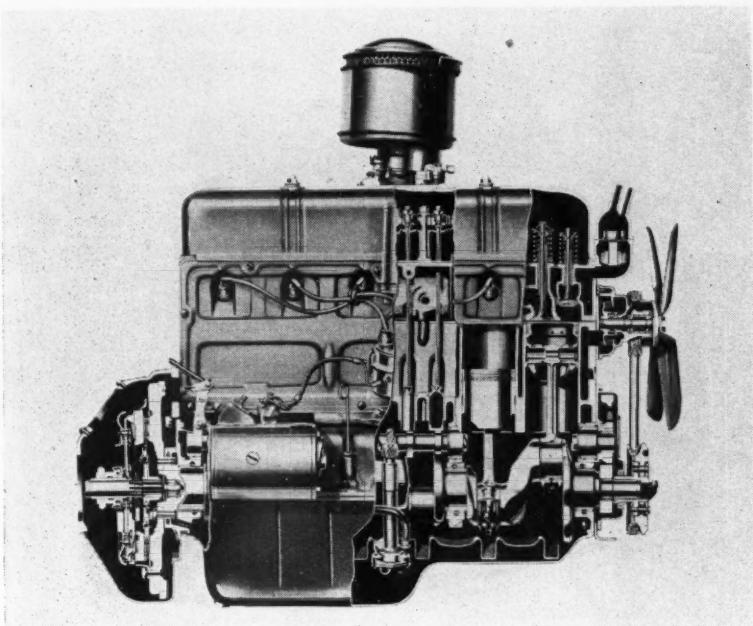
camber. Caster adjustment controlled by threads on eccentric pin. Caster adjustment made in complete turns of threaded pin.

Axle Shaft Removal

Remove wheel, dust cap and retaining nut from end of axle shaft, wheel hub and brake drum, disconnect brake line. Remove brake backing plate. Axle shaft is held in the housing by the backing plate, which when bolted in place, bears against the outer race of the bearing.



1941 CHEVROLET



Engine

Six cylinder $3\frac{1}{2}$ x $3\frac{3}{4}$ in. Displacement 216.5 cu. in. Taxable hp. 29.4. Brake hp. 90 at 3300 r.p.m. Compression ratio 6.50 to 1. Firing order 1-5-3-6-2-4. There is also a heavy duty engine $3\frac{9}{16}$ in. x $3\frac{15}{16}$ in., displacement 235.5 cu. in. Taxable hp. 30.4. Compression ratio 6.62 to 1. Brake hp. 93 at 3100 r.p.m. Tighten cylinder head bolts to 75 to 80 ft. lb. tension.

Engine Removal

When removing the engine it is necessary to disconnect the fenders from the body and the fender skirt-to-frame brace. Remove the sheet metal screws from the lower grille panel reinforcing strips across the openings in the panel under bumper brackets. Remove the bolts which attach the radiator brace rods to the radiator support and remove the brace rod from the body.

Radiator Core Removal

After removing hose connections, disconnect front end of radiator brace rods. Loosen both sides of the radiator brace rod from the dash. The brace rod can then be turned up to allow clearance for the core. Then remove wiring harness and remove two bolts which fasten radiator to support. Tilt core back at top and withdraw.

Carburetor

Carter W-1-483S. Approximate idle adjustment one-half to one turn open. Float level $\frac{1}{2}$ in., measured at the

end of the float opposite the gasoline intake needle and measured from the top of the float to the machined underside surface of the bowl cover with the gasket removed. Standard metering rod is 67-46, lean metering rod is 69-49. Use Carter gage No. T109-25 when setting metering rod.

Distributor

Delco Remy Model 1110090. Breaker point gap .018 in. Cam angle 38 deg. Maximum advance 39 deg. at 3450 r.p.m. Vacuum advance 20 deg. at 20 in. vacuum. Breaker points open 5 deg. before top center. Firing order 1-5-3-6-2-4. Polarity on breaker points reversed by means of switch operated by starting pedal.

Valves

Intake valve guides should extend $1\frac{1}{16}$ in. above the cylinder head, and exhaust valve guides should extend $6\frac{1}{64}$ in. above the cylinder head. Rocker arm shafts must be installed with open ends toward the center. There are four different types of

rocker arms used: right and left angled intake valve rocker arms and right and left hand exhaust valve rocker arms.

Arms marked 1 or 9 used for L.H. exhaust on cylinders 1-3-5.

Arms marked 0 or 2 used for R.H. exhaust on cylinders 2-4-6.

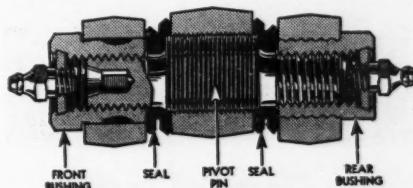
Arms marked 3 or 5 used for L.H. intake on cylinders 2-4-6.

Arms marked 4 or 6 used for L.H. intake on cylinders 1-3-5.

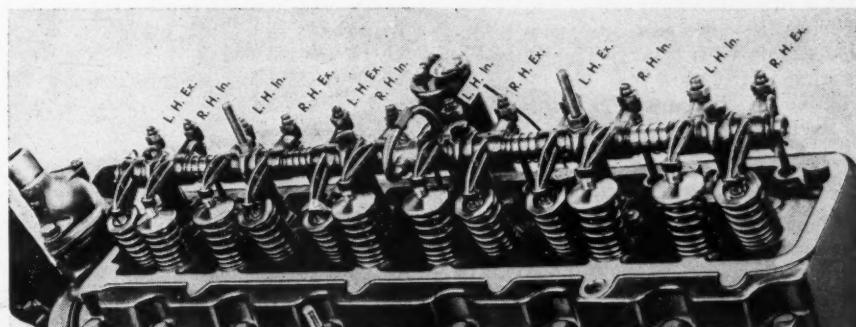
Valve tappet clearance intake .006 in., exhaust .013 in. Adjust to this clearance with the engine cold, or after it has been run for at least 30 min. If run for shorter time tappet clearance will be incorrect. Intake valve opens 3 deg. before top center and exhaust valve closes 5 deg. after top center.

Wheel Alignment

Caster zero to $\frac{1}{2}$ deg. Camber $\frac{1}{4}$ deg. negative, plus or minus $\frac{1}{2}$ deg. King pin inclination $4\frac{1}{4}$ deg. plus or minus $\frac{1}{2}$ deg. Toe-in zero to $1\frac{1}{16}$ in. Toe-out with inner wheel turned to angle of 20 deg., outer wheel should be 22 to 26 deg. To set caster and



camber loosen clamp bolt at upper end of steering knuckle support. Remove lubrication fitting from upper front pivot pin bushing. Insert $\frac{1}{4}$ in. Allen wrench in threaded eccentric pin. Caster adjusted by making complete turn of pin, while camber is adjusted by making fractional turns.



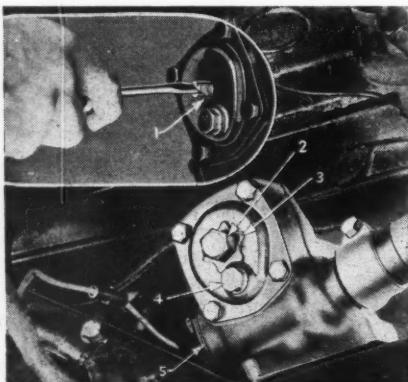
Model C-28

Engine

Starting serial number 7657501. Six cylinder, $3\frac{3}{8}$ x $4\frac{1}{2}$ in. Displacement 241.5 cu. in. Compression ratio 6.8 to 1 with standard cast iron head, and 7.2 to 1 with special equipment aluminum head. Maximum brake hp. 112 at 3600 standard, 115 at 3600 special. Compression pressure 115-125 at cranking speed with standard head. Firing order 1-5-3-6-2-4. Tighten cylinder head cap screws to 65-70 ft.-lb.

Pistons

Aluminum alloy, U-slot, cam ground. Fit cylinder to .002 in. clearance on thrust side of piston skirt. Removed from above.



Connecting Rods

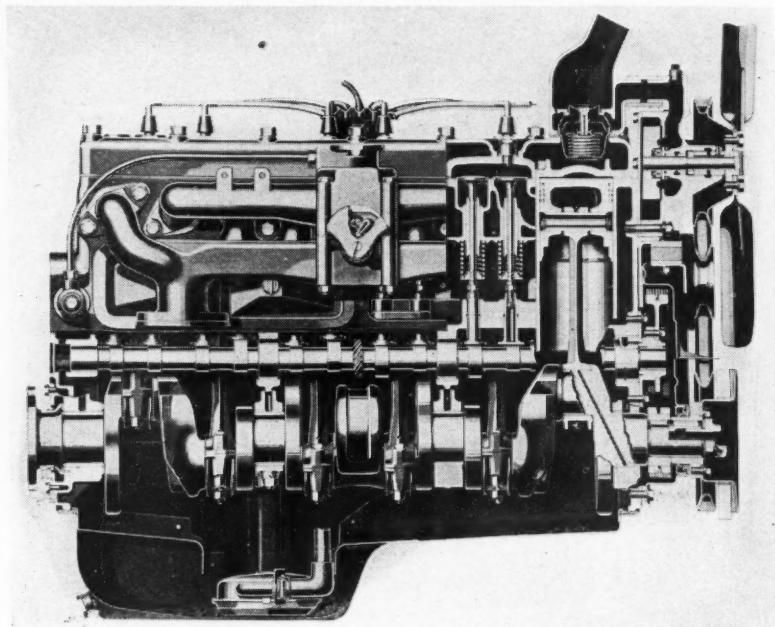
Steel back babbitt, slip-in type bearing. Install rod in engine with oil spray hole toward camshaft side of engine. Tighten bearing cap nuts to 45-50 ft.-lbs. Removed from above.

Main Bearings

Steel back babbitt, slip-in type. Upper and lower halves of No. 1, 2 and 3 are interchangeable, but No. 4 bearing is different and not interchangeable with others. Tighten main bearing cap nuts to 75-80 ft.-lb. Tighten main bearing cap screws to 80-85 ft.-lb.

Remove Front Bearing Cap

Remove the oil pan, clutch housing pan and the oil pump strainer. Remove the crankshaft pulley splash shield. Remove the two lower screws from the timing chain cover, holding



the oil pan front end oil seal plate, and remove the plate. Bearing cap can then be removed.

Valves

Valve seat angle, 45 deg. Valve spring pressure 40-45 lb. when compressed to $1\frac{1}{4}$ in. Install valve springs with closely coiled ends up. Operating tappet clearance, intake .008 in., exhaust .010 in. hot.

Spark Plugs

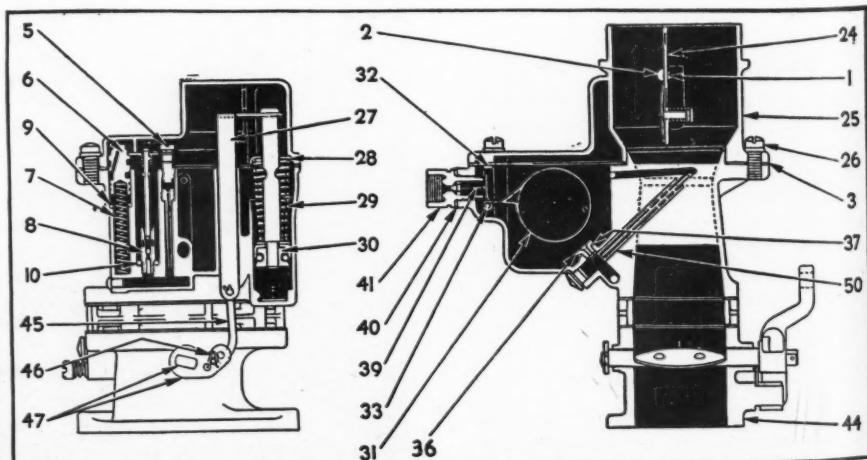
Auto-Lite Type A-7-B with cast iron head, Auto-Lite Type AL-7-A with aluminum head. Set spark plug gap .025 in.

Ignition Timing

Timing marks on vibration damper. Spark occurs at top dead center, or when pointer on timing case cover lines up with "DC" line on vibration damper.

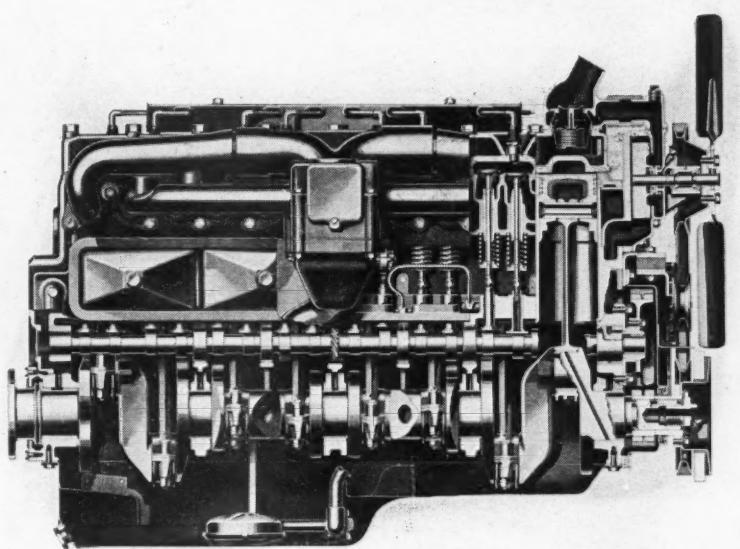
Gemmer worm and roller. To adjust for end play of steering gear worm shaft, remove the engine splash pan and disconnect the horn wire at the connector between the steering gear and the horn. Remove the cap screws holding the grease retainer cover and tube at the bottom of the steering gear body. Remove necessary amount of shims between the cover and the gear body. (Shims are .005 and .010 in. thick.)

End play of pitman arm shaft and the mesh of the worm and roller is adjusted with steering gear in center position. Disconnect tie rods from pitman arm. Remove lock nut and adjusting screw cover and lock in center of steering housing side plate. Tighten the roller shaft adjusting screw just enough to remove all free play, being careful not to cause a bind. Reinstall lock, cover and lock nut and connect tie rods.



1941 CHRYSLER

Model C-30



Engine

Starting serial number 6624101. Eight cylinder, $3\frac{1}{4} \times 4\frac{1}{8}$ in. Displacement 323.5 cu. in. Compression ratio 6.8 to 1. Compression pressure 120 lb. at cranking speed. Maximum brake hp. 137 at 3400 r.p.m. Firing order 1-6-2-5-8-3-7-4. Tighten cylinder head cap screws to 65-70 ft.-lb.

Pistons

Aluminum alloy, U-slot, cam ground Fit in cylinder with .002 in. clearance on thrust side of piston skirt. Removed from above.

Connecting Rods

Steel back, babbitt, slip-in type bearing. Install rod in engine with oil spray hole toward camshaft side of engine. Tighten bearing cap nuts to 45-50 ft.-lb. Removed from above.

Main Bearings

Steel back, babbitt, slip-in type. Upper and lower halves of main bearing shells are not interchangeable—shell with the oil hole is the upper half. Tighten main bearing cap nuts to 75-80 ft.-lb., and main bearing cap screws to 80-85 ft.-lb.

Remove Front Bearing Cap

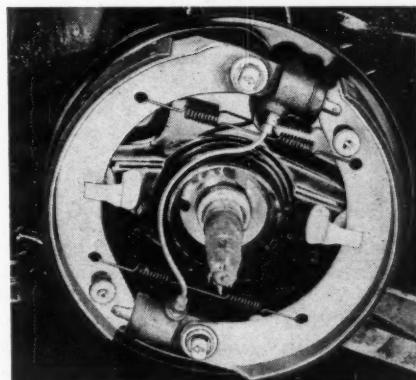
Front and rear main bearing caps are sealed in position and require a puller to remove. When removing the front main bearing cap, remove the two lower screws from the timing chain cover, as they extend into the bearing cap. Always install new rubber seals in the square cut grooves in the sides of the front and rear main bearing caps. Upset the bottom of the groove with a prick punch to prevent the rubber seals from sliding.

Ignition Timing

Timing marks on vibration damper. Spark occurs at top dead center, or when pointer on timing case cover lines up with "DC" mark on vibration damper.

Brakes

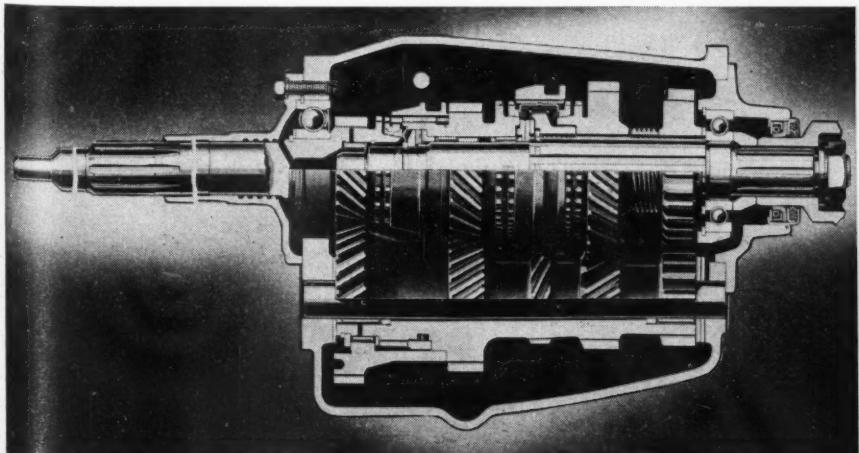
Lockheed hydraulic. Rear brakes are conventional two-shoe type, with double-piston wheel cylinder. Front brakes are two-shoe type using two single-piston wheel cylinders. Minor adjustment of front brakes is the same as for rear brakes—turn the adjusting cam for each shoe out toward the rim of the wheel, forcing the shoe against the drum, and then back it off until the shoe is just free of the drum.



Major Brake Adjustment

Rear wheels—start with the arrows on the heads of the anchor bolts pointing toward each other. Turn anchors inward (outer end of wrench moving toward center of wheel) until clearance between lining and drum at heel of front shoe is .006 in., and at the heel of the rear shoe .007 in. Clearance at the toe ends of each shoe should be .007 in.

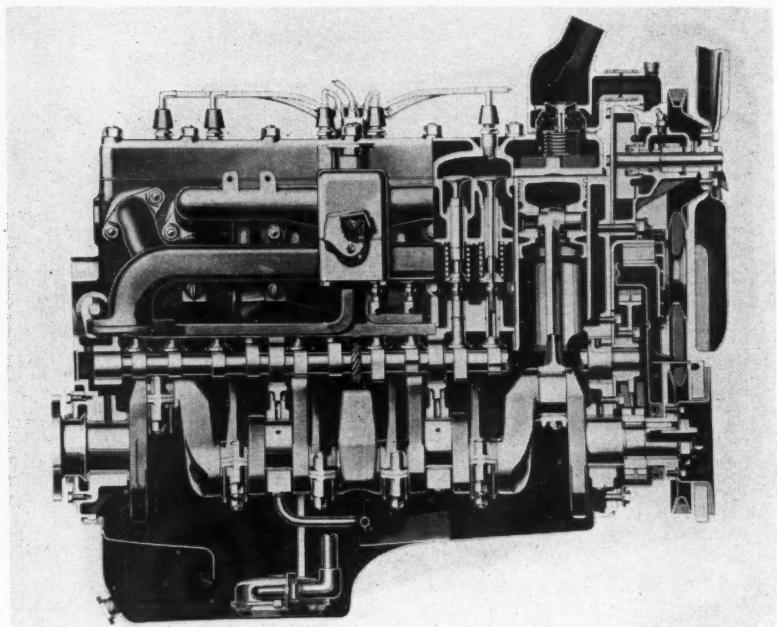
Front wheels—start with the arrows in the heads of the anchor bolts pointing toward the nearest wheel cylinder. Turn the anchors (both upper and lower) of the left brake in a clockwise direction, and the anchors of the right brake in a counter-clockwise direction to obtain a clearance of .006 in. between the lining and the drum at the heel of each shoe. With the cam adjuster, set each shoe to give .007 in. clearance at the toe of each shoe.



Model S-8

Engine

Starting serial number 5720401. Six cylinder, $3\frac{3}{8}$ x $4\frac{1}{4}$ in. Displacement 228.1 cu. in. Maximum brake hp. 105 at 3600 r.p.m. with standard head. Compression ratio 6.8 to 1 with standard cast iron head, 7.2 to 1 with optional aluminum head. Compression pressure 115-125 lb. at cranking speed. Firing order 1-5-3-6-2-4. Tighten cylinder head cap screws to 65-70 ft.-lb.



Connecting Rods

Steel back babbitt, slip-in type bearing. Install in engine with oil spray oil toward camshaft side. Tighten bearing cap nuts to 45-50 ft.-lb.

Main Bearings

Steel back babbitt, slip-in type bearings. Upper and lower halves of No. 1, 2 and 3 bearings are interchangeable, but No. 4 shells are different. Tighten main bearing cap nuts to 75-80 ft.-lb., and cap screws to 80-85 ft.-lb.

Remove Front Bearing Cap

Remove the oil pan, clutch housing pan and the oil pump strainer. Remove the crankshaft pulley splash shield. Remove the two lower screws from the timing chain case cover to the oil pan front end oil seal plate and remove the plate. Remove main bearing cap nuts and remove bearing cap.

Valve Timing

Valves are in time when punch marks on camshaft and crankshaft gears are together and in line with shaft centers. To check, set intake valve tappet clearance at .014 in. for No. 6 cylinder. Use dial indicator in No. 6 spark plug hole. Turn engine until dial indicator shows piston to be .059 in. before top dead center. At this point No. 6 intake valve tappet should just touch end of valve.

Front Wheel Alignment

Caster angle, negative 1 deg. to positive 1 deg. Adjusted by eccentric threaded bushing in upper control arm yoke. Camber angle, zero to $\frac{3}{4}$ deg. Adjusted by turning eccentric threaded bushing in upper control arm yoke. This same bushing controls

caster and camber angle. Toe-in, zero to $\frac{1}{8}$ in. To adjust, loosen clamp bolts on end of both tie rods, and turn

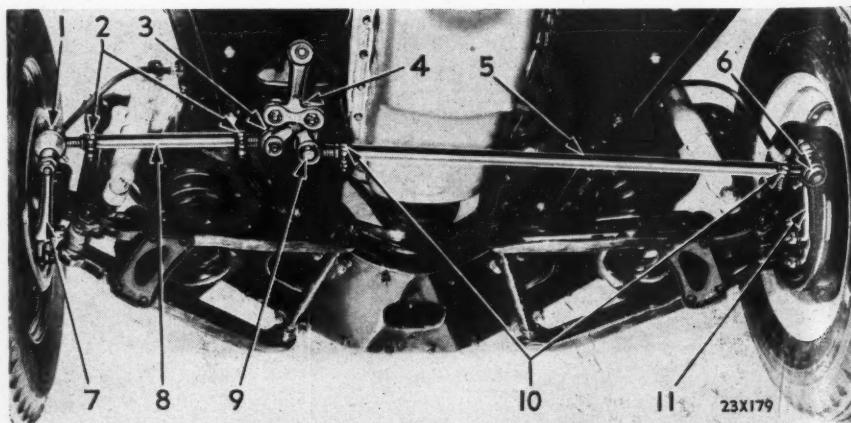
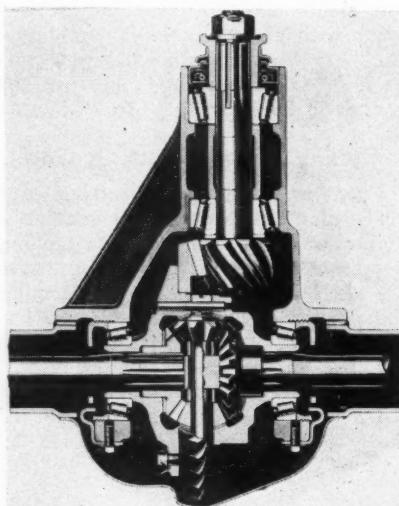
each tie rod the same amount to equalize toe-in on each wheel.

Rear Axle Shaft Removal

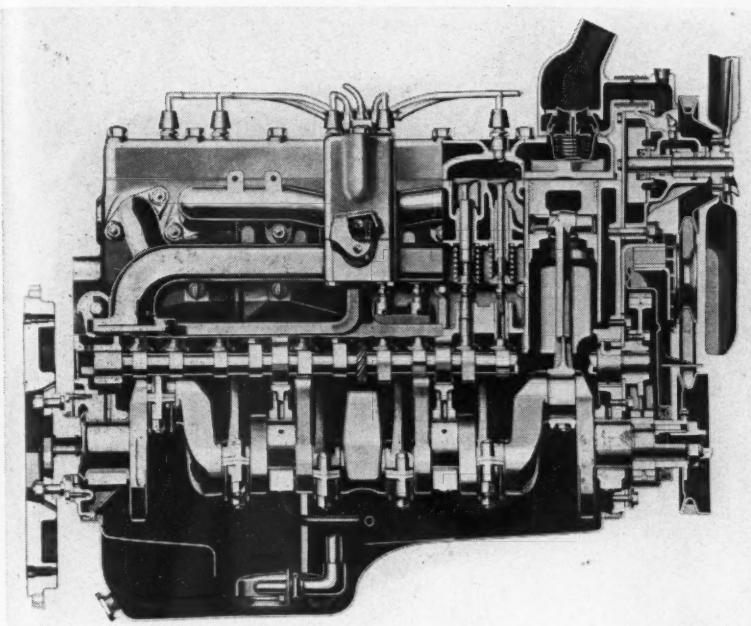
Do not use knock-off type wheel hub puller. Remove wheel, axle shaft cotter pin and nut, and pull hub and drum assembly from shaft with puller. Remove stud nuts holding oil seal and brake support to axle housing and remove seal and brake support. Be sure to reinstall same number of bearing shims when reassembling. Pull axle shaft from housing.

Fluid Drive

Fluid drive unit should be inspected every 15,000 miles to maintain correct fluid level. To check level of fluid turn the unit until a filler plug can be reached through the filler hole in the clutch housing. Remove filler plug. Fluid should be level with bottom of filler hole.



1941

DODGE**Model D-19**

Engine

Starting serial number 30342401. Six cylinder, $3\frac{1}{4} \times 4\frac{3}{8}$ in. Displacement 217.8 cu. in. Maximum brake hp. 91 at 3800 r.p.m. Compression ratio 6.5 to 1. Compression pressure, 142 lb. at 1000 r.p.m. Firing order 1-5-3-6-2-4. Tighten cylinder head cap screws 65-70 ft.-lb.

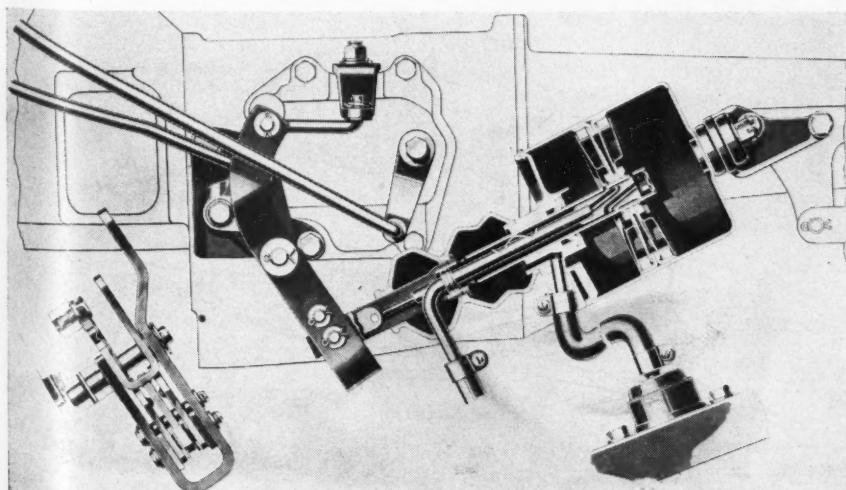
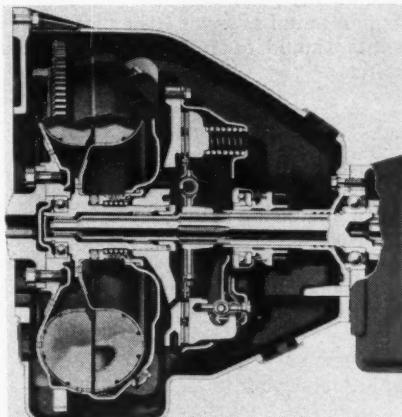
Valve Timing

Valves are correctly timed when punch marks on camshaft and crank-shaft gears are together and in line with shaft centers.

Main Bearings

Steel back babbitt, slip-in type. Upper and lower halves of bearing shells are not interchangeable—shell having oil hole is the upper half.

Tighten main bearing stud nuts to 75-80 ft.-lb. Tighten cap screws to 80-85 ft.-lb.



Carburetor

Stromberg Model BXV 3, $1\frac{1}{4}$ in. Idle adjusting screw controls gas—turn out for rich mixture, in for lean. Accelerating pump has three adjustments covering length of stroke—use hole giving short stroke for summer driving. To check float level remove carburetor air horn and measure from top edge of float chamber to fuel level—distance should be $\frac{5}{8}$ in.

Valves

Valve seat angle, 45 deg. Install spring with closely coiled end up. Valve spring pressure 40-45 lb. when compressed to $1\frac{1}{4}$ in. Operating tapet clearance, intake .008 in., exhaust .010 in.

Power Shift

Neutral position is maintained by a boss on the detent spring indexing with a notch in valve lever. Detent spring can be adjusted in position by loosening clamp bolt after removing selector rod. Jack up rear wheels and start engine. Move power lever and links back and forth slightly, and at the same time move the selector arm until a positive crossover is felt. Then shift detent spring so that boss indexes with notch in lever, and tighten bolt. Reconnect selector rod, tightening the nut at the bottom of the steering gear until all play is removed from rod, and then tighten lock nut. Lubricate boss on detent spring.

Distributor

Auto-Lite Model IGS-4112-1. Centrifugal and vacuum advance. Maximum advance 24 deg. at 3500 r.p.m. Breaker point gap .020 in. Breaker arm spring tension 17-20 oz. Cam angle $34\frac{1}{2}$ to 38 deg.

Ignition Timing

Timing marks on vibration damper. Adjust distributor so that spark occurs at top center, or when pointer on timing case cover lines up with "DC" mark on vibration damper.

Generator

Auto-Lite Model GDZ-4801-A. Current and voltage regulation. Maximum charging rate 35 amperes at 8 volts.

Model 11-A

Engine

Eight cylinder, $3\frac{1}{16} \times 3\frac{3}{8}$ in. Displacement 221 cu. in. Taxable horsepower 30.0. Compression ratio 6.15 to 1. Compression pressure 100 lb. at cranking speed. Normal vacuum gage reading at sea level 20 in., at 1000 ft. 19 in., at 2000 ft. 18½ in., at 4000 ft. 17 in. Firing order 1R-1L-4R-4L-2L-3R-3L-2-R. Tighten cylinder head nuts to 50 ft. lb.

Carburetor

Ford Chandler Groves. Turn idle adjusting screw out for richer mixture. Approximate adjustment $\frac{1}{8}$ turns open. Fuel 11/16 in. below top surface of float bowl, with 3 lb. fuel pressure. Accelerating pump; use center hole for normal operation, inner hole for summer and outer hole for winter operation. Main metering jet .050 in., Idle hole No. 71. Pump discharge hole No. 70 drill. Power valve is held against its seat until vacuum drop to about 8½ to 9 in. of mercury or at 3800 r.p.m. of the engine on level road. Accelerating pump can be checked by removing air horn and operating pump with small amount of fuel in bowl. If check is leaking, air or fuel will bubble back into fuel bowl from inlet hole.

Distributor

Breaker point gap .014 to .016 in. When adjusting gap or timing the distributor be sure that ignition coil is in place, otherwise breaker point gap will be greater than specified. Adjust vacuum brake until spark ping is removed. Best results usually

attained by having spark control on left side of distributor in full advance or upper position and then adjusting vacuum brake. Automatic advance 16 deg. Manual advance 10 deg. Breaker points should open 4 deg. before top center.

Valve Timing

With valve tappets set at .013 in., intake valve opens at top center. When installing timing gears, marks on two gears should be brought together. Top bolt hole of timing case cover has reamed hole for special bolt which is provided with a shoulder. Install this bolt first to insure proper positioning of cover and correct distributor location.

Operating Tappet Clearance

Intake and exhaust valve stems

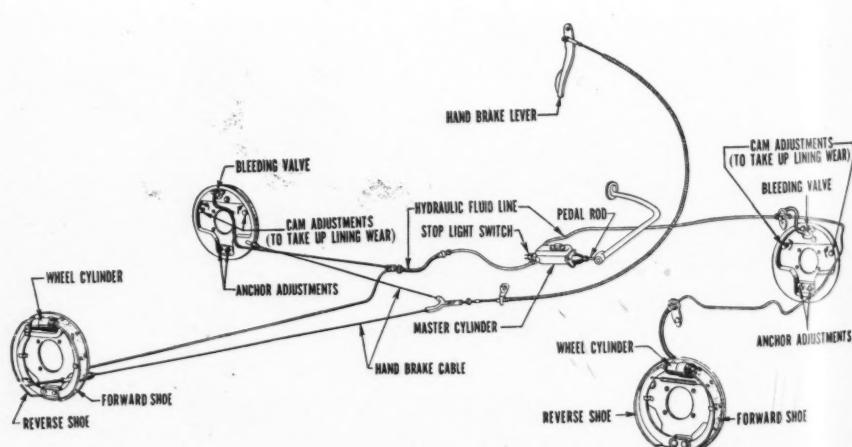
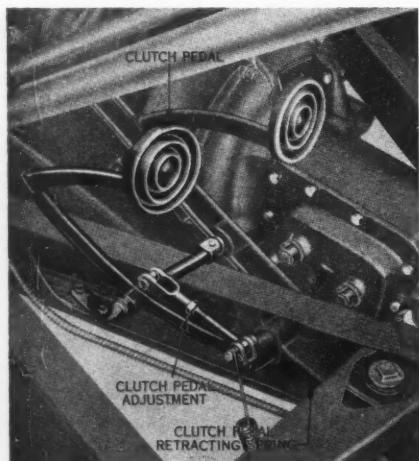
should be ground to obtain .011 in. clearance with the engine cold.

Connecting Rods

Connecting rod and piston assemblies are removed through the top of the block. Bearings are of the replaceable type. Correct rod bearing clearance is .003 in. End play .010 in. Pistons are stamped with an arrow on the top, which should point toward the front of the engine. Rods are marked L1, L2, L3, L4 for the left bank and R1, R2, R3, R4, for the right bank.

Radiator Removal

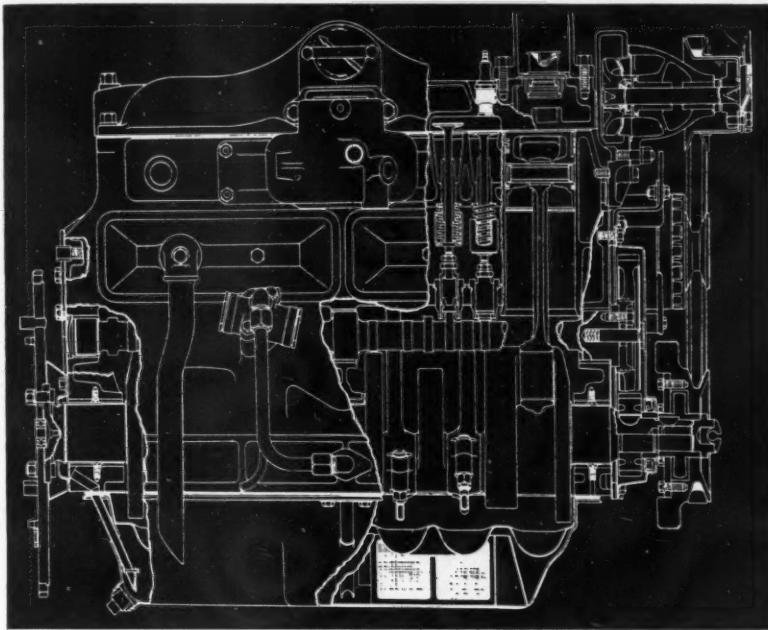
Drain cooling system. Remove radiator hose connections. Unbolt core side braces and remove nuts from lower mounting at each side of core. Remove radiator core.



1941

HUDSON

Model 10



Engine

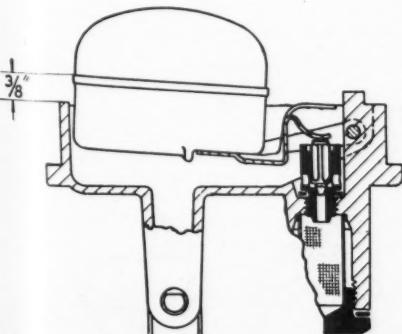
Starting serial number 10101. Six cylinder 3 x 4½ in. Displacement 175 cu. in. Maximum brake hp. 92 at 4000 r.p.m. Compression ratio 7.25 to 1. Compression pressure 125 lb. at cranking speed. Firing order 1-5-3-6-2-4. Tighten cylinder head bolts to 40 ft.-lb. tension.

Connecting Rods

Babbitt bearing spun in rod, not adjustable. Necessary to replace complete rod to correct for worn bearing. Connecting rods are offset—install long side of bearing toward rear in cylinders 1, 2 and 4; long side of bearing toward front in cylinders 3, 5 and 6. Palnut used as lock nut instead of cotter pin. Tighten cap bolt nuts to 40 ft.-lb. tensions. Rods removed from above.

Pistons

Aluminum alloy, T-slot, cam ground. Two compression and one oil ring pinned in grooves above the pin, and



one oil ring pinned in groove below the pin. Remove from above. Fit in cylinder to .0015 in. clearance on thrust side of piston.

Valves

Valve seat angle, 45 deg. Valve spring pressure 40 lb. when compressed to 2 in. Operating tappet clearance, intake .006 in., exhaust .008 in.

Valve Timing

Valves are correctly timed when the punch-marked tooth of the crankshaft gear meshes between the two punch-marked teeth of the camshaft gear.

Distributor

Auto-Lite, Model IGW 4203-A. Centrifugal and vacuum advance. Maximum advance, 23½ deg. at 3150 r.p.m. Breaker point gap .020 in. Breaker arm spring tension, 17-20 oz. Cam angle 34 deg.

Ignition Timing

Timing marks on flywheel, visible through hole in left side of flywheel housing. Adjust distributor so that spark occurs approximately ½ in. on the flywheel, or 2½ teeth, before top dead center.

Spark Plugs

Hudson-Champion Special, Model J-9. Spark plug gap .032 in.

Carburetor

Carter, Model WA1-454 S, 1¼ in. Idle adjusting screw controls gas—turn out for rich mixture, in for lean.

To check float level, remove bowl cover and turn upside down. Measure from machined surface of projection on bowl cover to top of soldered seam of float. Distance should be ¾ in.

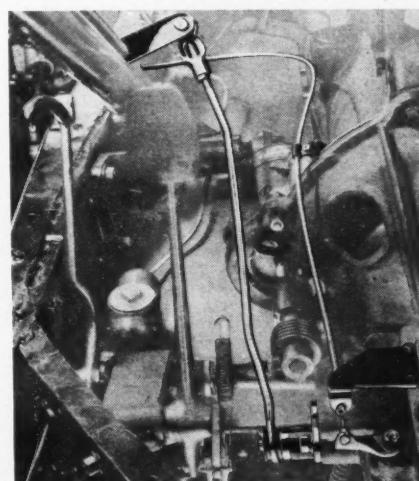
Gear Shift Adjustment

To adjust the cross shift, place the hand shifting lever in the up position. Loosen the bolt holding the cable housing bracket to the steering column, and remove all slack from the cable housing. Check shift lever at transmission to be sure cable is correct length to force cross-over shaft to the low and reverse side. Tighten cable retaining bracket and nuts holding cable to transmission lever.

Place hand shift lever in neutral position. Remove clevis pin from the steering gear end of shift control rod. Loosen the lock nut and adjust the clevis so that pin will drop in to operating lever with shift lever at transmission in the neutral position.

Brakes

Bendix hydraulic, with mechanical over-ride for rear wheels only. Adjust brake pedal to allow ¼ in. clearance between pedal shank and underside of floorboard with pedal in fully released position. For minor brake adjustment, remove adjusting hole cover and expand shoes by turning notched adjusting wheel until the wheel can just be turned over by hand—then back off the adjusting wheel 14 notches. Repeat the same adjustment on all four wheels.



Models 11 & 12

Engine

Starting serial number: 11201 for Model 11, 12202 for Model 12. Six cylinder, 3 x 5 in. Displacement 212 cu. in. Maximum brake hp., 102 at 4000. Compression ratio 6.5 to 1. Compression pressure 120 lb. at cranking speed. Firing order 1-5-3-6-2-4. Tighten cylinder head nuts to 40 ft.-lb. tension.

Connecting Rods

Babbitt bearing, spun in rod—not adjustable. Rods are offset at bearing end and are to be installed: long side of bearing toward front of engine in cylinders 3, 5 and 6; long side of bearing toward rear in cylinders 1, 2 and 4. Rods and pistons removed from above.

Valve Timing

To check valve timing, set intake valve tappet of No. 1 cylinder at .010 in. clearance and use .002 in. feeler gage to detect tappet screw contact. Intake valve should open 10 deg. or 4 flywheel teeth before top center as indicated by mark on flywheel lining up with pointer at the timing hole in the left front face of the flywheel housing.

Ignition Timing

Adjust distributor so that spark occurs $\frac{1}{2}$ in. on flywheel or approximately 2 teeth, before top dead center, as indicated by marks on flywheel lining up with pointer at timing hole in left front face of flywheel housing.

Carburetor

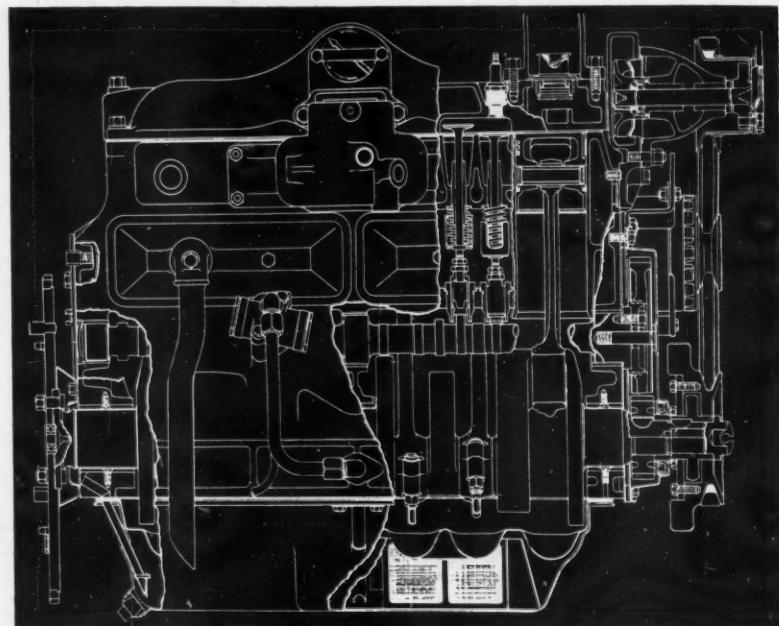
Carter, Model WDO-501-S, dual, 1 in. Idle adjusting screw controls gas —turn out for rich mixture, in for lean. To set float level, remove cover and float assembly, hold cover upside down and measure distance between float seam and cover. Adjust lip on float arm to make this distance $3\frac{1}{32}$ in.

Generator

Auto-Lite, Model GEC-4801-A, third brush type with voltage regulator. Maximum charging rate 37 amperes, hot, at 8 volts.

Front Wheel Alignment

Caster, 0 to $\frac{1}{4}$ deg. Camber, $\frac{1}{4}$ to $\frac{3}{4}$ deg. Toe-in, 0 to $1\frac{1}{16}$ in. Caster



and camber are adjusted by eccentric threaded bushing in upper end of steering knuckle support arm. One complete revolution of bushing changes caster $\frac{1}{2}$ deg. Adjust toe-in by turning both tie rods an equal amount.

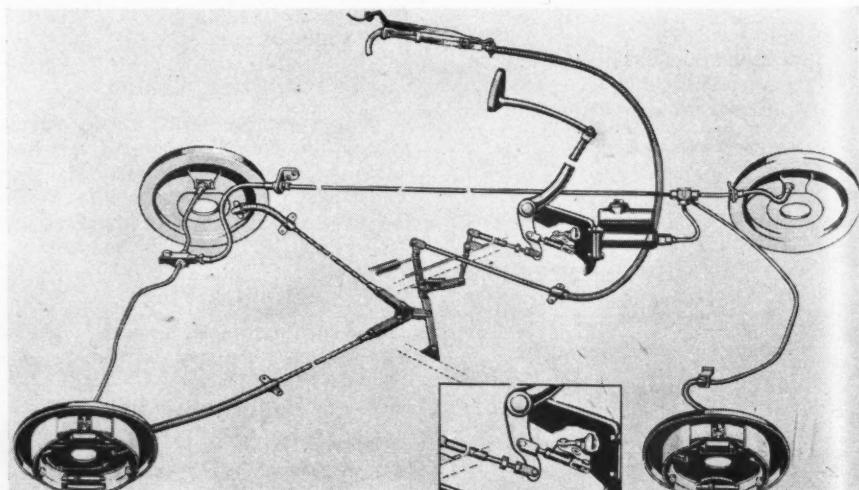
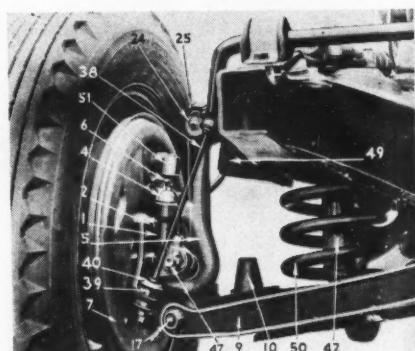
Starter

Auto-Lite, Model MZ-4092. Bendix drive, with solenoid control.

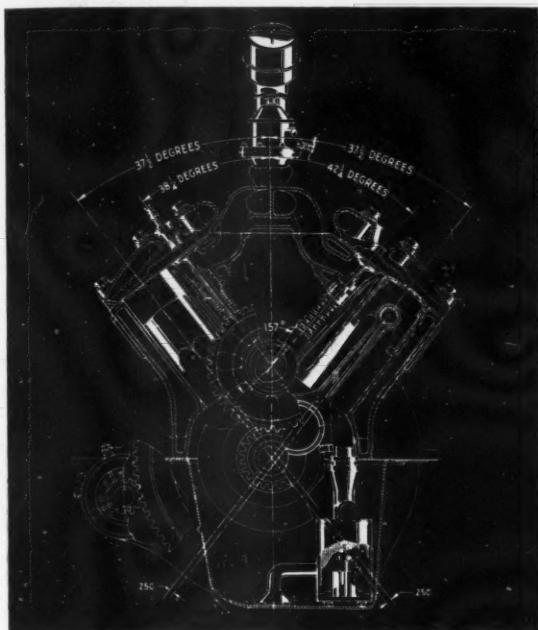
Brakes

Bendix hydraulic, with mechanical over-ride on rear wheels only. To adjust the mechanical hook-up after the hydraulic brake adjustments have been made, check to see that brake control lever is against its stop.

Loosen lock nut and adjust the push rod to provide $1\frac{1}{4}$ in. between the rear face of the collar and the front face of the push rod.



Zephyr



Engine

Twelve cylinder 2 7/8 x 3 3/4 in. Displacement 414 cu. in. Taxable hp. 46.8. Compression ratio 7.20 to 1. Compression pressure 110 lb. at cranking speed. Firing order 1L, 2R, 5L, 4R, 3L, 1R, 6L, 5R, 2L, 3R, 4L, 6R.

Valves

Plungers in cylinder of the hydraulic unit are not interchangeable. Care must therefore be taken not to mix them when removed from the engine. Before replacing valve lifters, be sure to wash off all oil. Lifters will fill with oil after engine is started. After installing, it may require about one hour of engine operation to refill lifters and eliminate noise. A minimum of 12 lb. oil pressure is required at plug above metering hole, with the engine operating at high speed, or not less than 4 lb. at idle. Plunger must have free fit in cylinder, but not too much clearance. Ball check must hold to an extent that kerosene will only drip through about one drop per second. Check ball must be free on seat. There should be .030 to .070 in. clearance between the valve stem and the top of the plunger, measured with no oil in the hydraulic unit and with the plunger and plunger spring fully compressed. Use a screw driver to compress the plunger when making the check.

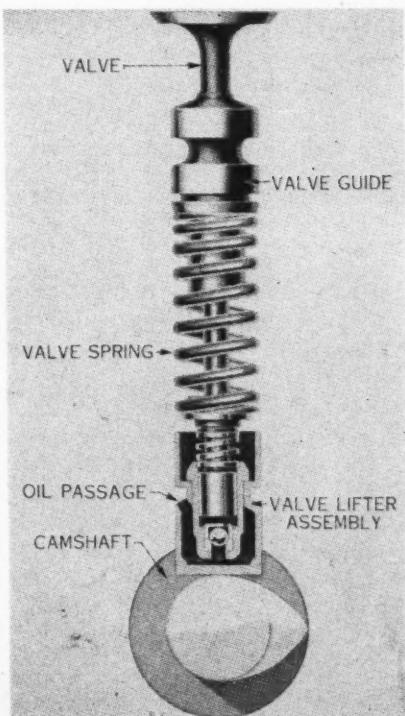
Distributor

Distributor fires at 37 1/2 and 22 1/2 deg. intervals. Breaker point gap .014 to .016 in. Spark starts to ad-

vance at 8 m.p.h. car speed. Maximum advance is 8 1/2 deg. All odd numbers on distributor are for left hand block of cylinders. Even numbers for right hand block. Rear contact on rotor carries current from right hand coil to cylinders in right hand block.

Carburetor

Stromberg model EE1. Turn idle adjustments out for richer mixture.



To check setting of economizer, place a 19/64 in. piece of drill rod between throttle valve and inner wall of throttle barrel. Piston should just contact economizer with drill rod in place. Fuel level 15/32 in., with 3 lb. fuel pressure.

Valve Timing

Intake valve opens 10 2/3 deg. or 3 1/2 flywheel teeth before top center. Top hole in timing case cover is reamed to take a special bolt provided with a shoulder. Install this bolt first to obtain proper alignment of cover and accurate positioning of distributor. When installing timing gears, marks on two gears should be brought together.

Radiator Grille Removal

Each side of grille is secured by eight screws around edge of grille section. Removal of these screws permits removal of grille.

Radiator Core Removal

Drain cooling system. Remove radiator hose connections. Remove generator and fan. Disconnect heat indicator wire. Remove hold down bolts on each side of core. Tilt core back and lift out.

Spark Plugs

Standard equipment: Champion model H-10. Correct gap .029 in.

Wheel Alignment

Caster 4 deg. Camber $\frac{1}{4}$ to $\frac{3}{4}$ deg. Toe-in 1/16 in. King pin inclination 3 1/4 to 4 1/4 deg.

Valve Springs

Intake and exhaust valve spring pressure with valve closed 54 lb., with valve open 116 lb.

Gear Shift

The two rods connecting the levers on the steering column to the levers on the gear shift housing are adjustable. Whenever position of steering column has been changed, the length of these rods should be readjusted. Rods are adjusted so that the gears in neutral and the two levers on the steering column are in line with each other. In this position, gear shift lever can be moved up and down without binding.

MERCURY 1941

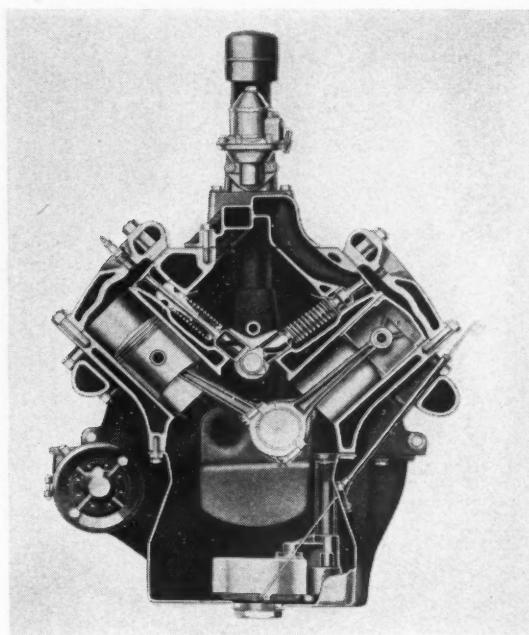
Model 19-A

Engine

Eight cylinder, 3.187 x 3.75 in. Displacement 239 cu. in. Taxable horsepower 32.5. Compression ratio 6.15 to 1. Compression pressure 100 lb. at cranking speed. Tighten cylinder head nuts to 50 ft. lb. Firing order 1R-1L-4R-4L-2L-3R-3L-2R.

Carburetor

Turn idle adjustments out for richer mixture. Approximate setting $\frac{7}{8}$ turns open. Fuel level 11/16 in. below top surface of float bowl, with 3 lb. fuel pressure. Accelerating pump: use center hole for normal driving, inner hole (shorter stroke) for summer and outer hole for winter driving. Power valve is held against its seat until vacuum drops to about 8 $\frac{1}{2}$ to 9 in. of mercury or at 3800 r.p.m. of engine



points should open 4 deg. or approximately 1 $\frac{1}{4}$ flywheel teeth before top center.

Valve Timing

With intake valve set at .013 in., with the engine cold, intake valve opens at top center. When installing timing gears, marks on camshaft and crankshaft gears should be together. Top hole of timing case cover has a reamed hole for special bolt which has a reamed shoulder. Install this bolt first to insure proper positioning of timing case cover and for correct distributor location.

Oil Pan Removal

To remove oil pan: Remove engine front mounting nuts. Remove starter. Raise front end of engine with chain hoist. Remove left exhaust

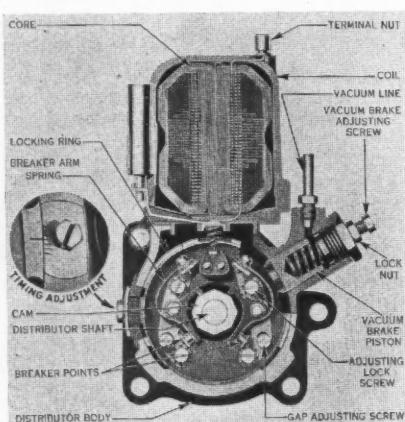
pipe. Raise engine 4 in. and block in that position. Disconnect radius rod at rear and place a 12 in. block between ball and cross member. Remove oil pan cap screws and drop pan. Front oil seal should be soaked in engine oil 45 minutes to prevent scoring fan pulley hub and causing oil leakage.

Radiator Grille Removal

Grille secured on each side by six bolts which pass through fender skirt. Remove these nuts from underside of fenders. Also remove six bolts from upper edge of grille and single bolt on bottom edge. Lift out grille assembly.

Spark Plugs

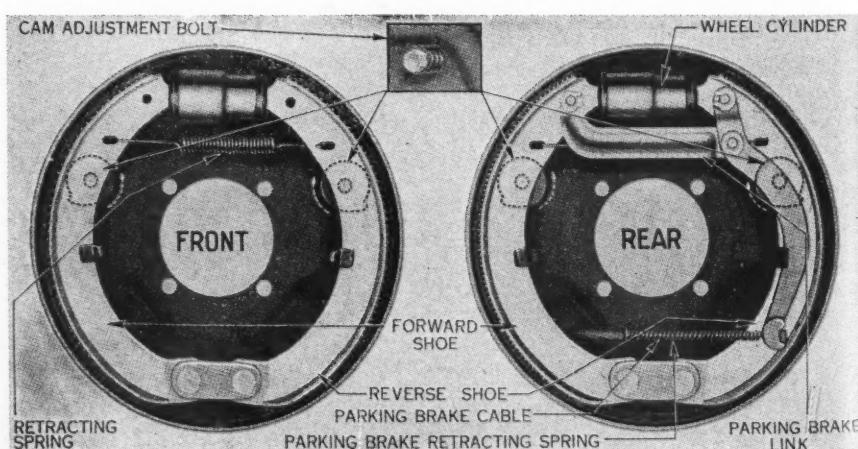
Standard equipment champion model H-10. Correct gap .025 in.



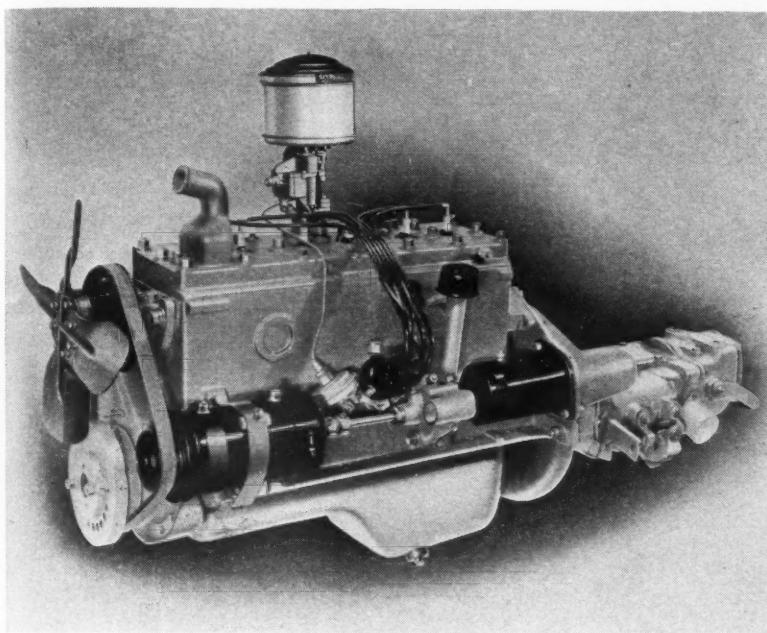
on level road. Accelerating pump can be checked by removing air horn and operating pump with small amount of fuel in bowl. If check is leaking, air or fuel will bubble back into fuel bowl from inlet hole.

Distributor

Breaker pointing gap—.014 to .016 in. When adjusting breaker point gap or when timing distributor, be sure that ignition coil is in place. Otherwise breaker point gap will be greater than specified. Adjust vacuum brake until engine ping is removed. Best results usually attained by having spark control on left side of distributor in full advance or upper position and then adjusting vacuum brake. Automatic advance 16 deg. Manual advance 10 deg. Breaker



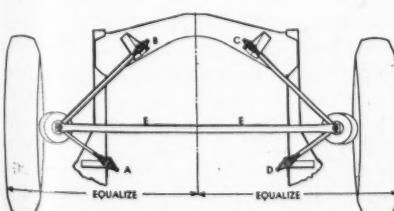
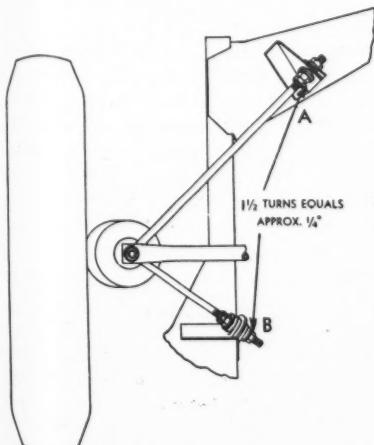
Model 600

**Engine**

Starting serial number K5001. Six cylinder, $3\frac{1}{4} \times 3\frac{3}{4}$ in. Displacement 172.6 cu. in. Maximum brake hp. 75 at 3600 r.p.m. Compression ratio 6.7 to 1. Compression pressure 120 lb. at cranking speed. Firing order 1-5-3-6-2-4. Tighten cylinder head bolts to 61-64 ft.-lb. tension.

Pistons

Aluminum alloy, cam ground, tin plated. Fit in cylinder with .002 in.



clearance on thrust side of piston, and with slot in skirt away from the cam-shaft side of engine. Removed from above.

Valve Timing

Intake valve opens 6 deg. or 2 fly-wheel teeth before top dead center. Valves are in time when punch marks on camshaft and crankshaft gear are together and in line with shaft centers.

Distributor

Delco, Model 1110512. Centrifugal and vacuum advance. Maximum advance, 20 deg. at 2400 r.p.m. Breaker point gap .020 in. Breaker arm spring tension 17-21 oz. Cam angle, 35 deg.

Ignition Timing

Timing marks on vibration damper. Spark occurs at top dead center, or when pointer on timing case cover lines up with "DC" mark on vibration damper.

Spark Plugs

Auto-Lite, Type AN7. Spark plug gap .025 in.

Carburetor

Carter, Model BBRI-513S, $1\frac{1}{4}$ in. Idle adjusting screw controls gas—turn out for rich mixture, in for lean. Float level $5/64$ in. from top of float chamber to top of float.

Brakes

Lockheed hydraulic. Adjust pedal to give $\frac{1}{2}$ in. free travel measured at pedal pad. Minor brake adjustment—

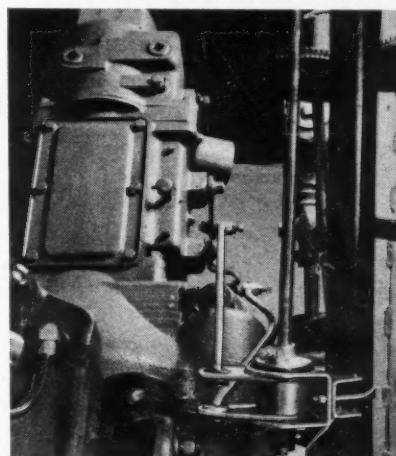
turn adjusting cam out until shoe contacts drum, then back it off until drum is free; repeat at each shoe.

Front Suspension

Independent front wheel suspension, Lancia type. Caster angle, 0 deg., adjusted by lengthening and shortening radius rods attached from frame to top of king pin. Camber angle, 0 to $\frac{1}{2}$ deg., adjusted by shortening radius rods on one side of car and lengthening those on opposite side. Changing camber angle of one wheel affects camber angle of opposite wheel. Toe-in, 0 to $1/16$ in., adjusted by turning both tie rods an equal amount.

Steering

Gemmer worm and roller. To adjust for end play in steering tube, remove end plate at bottom of steering column and remove shims. To



adjust for lost motion between worm and roller shaft, necessary to remove roller shaft cover plate and remove shims on roller shaft between thrust washer and inside of housing.

Steering Post Shift

To locate neutral position, insert wire pin through holes in shifting levers at bottom of steering column to hold these levers in same relative position. Disconnect shifter rods at operating levers on transmission and check to be sure that gears are in neutral position. Adjust shifter rods so that they will enter transmission operating levers while held in neutral position.

Ambassador 6

Engine

Starting serial number R-353001. Six cylinder, valve-in-head, $3\frac{3}{8} \times 4\frac{3}{8}$ in. Displacement 234.8 cu. in. Maximum brake hp. 105 at 3400 r.p.m. Compression ratio 6.3 to 1. Compression pressure 125 lb. at 350 r.p.m. Firing order 1-5-3-6-2-4. Tighten cylinder head nuts to 65-70 ft.-lb. tension.

Connecting Rods

Steel back babbitt, slip-in type bearing. Palnuts used on bearing cap bolts instead of lock washers. Tighten bearing cap bolt nuts to 50-55 ft.-lb. tension.

Pistons

Aluminum alloy, cam ground, split skirt, tin plated. Two compression and two oil rings above the pin. Fit in cylinder to .002 in. clearance on thrust side of piston.

Main Bearings

Steel back babbitt, slip-in type. Tighten main bearing cap screws to 66-70 ft.-lb. tension.

Valves

Seat angle, 45 deg. Two valve springs used per valve. Valve spring pressure, outer spring, 38 lb. when compressed to $1\frac{11}{16}$ in.; inner spring, 21 lb. when compressed to $1\frac{1}{8}$ in. Operating tappet clearances, .015 in.

Valve Timing

Valves are in time when punch marks on camshaft and crankshaft sprockets are together and in line with shaft centers. Intake valve opens 11 deg. or 3 flywheel teeth after top dead center.

Distributor

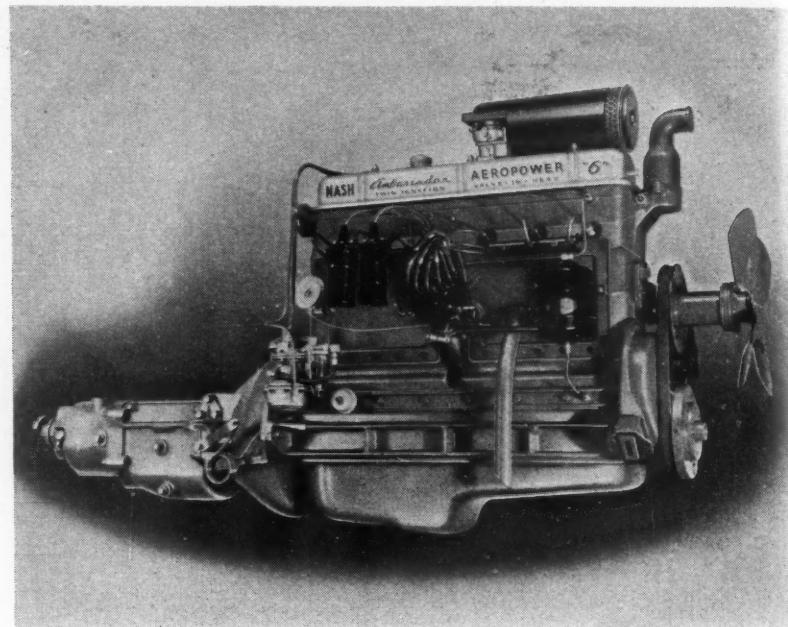
Auto-Lite, Model IGE 4024, twin ignition. Centrifugal advance. Maximum advance 23 deg. at 1750 r.p.m. Breaker point gap .020 in. Breaker arm spring tension, 17-20 oz.

Ignition Timing

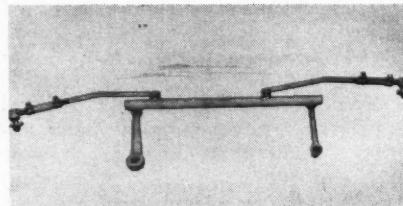
Timing marks on vibration damper. Adjust distributor so that spark occurs 6 deg. or $1\frac{1}{2}$ flywheel teeth before top center.

Front Suspension

Parallel link coil spring type. Tubular type shock absorbers mounted



inside coil springs. Caster angle, zero to $\frac{1}{2}$ deg. negative. To adjust caster, loosen upper control arm pivot bar attaching bolts (on top of frame side rail), shift the pivot bar and upper control arm assembly toward center of car and install "C" washers over the bolts and between the pivot bar and the space plate as required to obtain correct caster angle. "C" wash-



ers are provided in $\frac{1}{16}$ in. and $\frac{1}{32}$ in. thicknesses. To adjust camber (desired setting is $\frac{1}{4}$ to $\frac{3}{4}$ deg.) loosen pivot bar attaching bolts and remove or install equal number of shims on each bolt to obtain desired setting. Desired toe-in is $\frac{1}{32}$ to $\frac{3}{32}$ in., and is adjusted by turning each



tie rod an equal amount. Turning left tie rod toward front of car increases toe-out while turning the right tie rod toward front increase toe-in.

Carburetor

Carter, Model WA1-435S. Idle adjusting screw controls gas—turn out for rich mixture, in for lean. To set float level remove float bowl cover and float assembly, turn the unit upside down and bend lip of float arm to give distance of $\frac{3}{8}$ in. from top of projection on bowl cover to top of soldered seam at front end of float.

Brakes

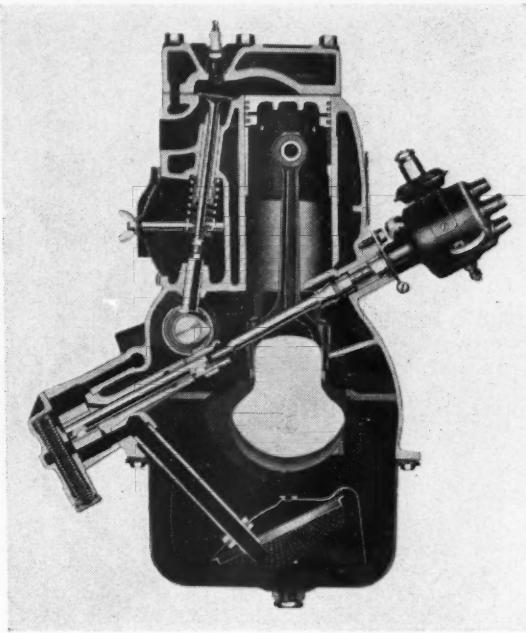
Bendix hydraulic. Adjust pedal to $\frac{1}{4}$ to $\frac{1}{2}$ in. free travel. To adjust for wear, expand notched adjusting wheel until shoes contact drum so that the wheel can just be turned over by hand, and back off 14 notches. Adjust hand brake at adjustment equalizer to remove all slack from cables while hand brake operating lever is pulled on 2 notches.

Overdrive

The overdrive unit operates automatically when control button on dash is pushed in—with button in the "out" position overdrive is not operative. Adjustment of overdrive control cable—loosen cable at operating lever on overdrive unit; pull control button out from dash $\frac{1}{8}$ in.; adjust cable so that it will connect to overdrive operating lever when lever is in "overdrive" position and button is $\frac{1}{8}$ in. out from dash. To lock out the overdrive unit the button must be pulled out while the car is in motion and pulling, and below a speed of 25 m.p.h.

1941 OLDSMOBILE

Six



Engine

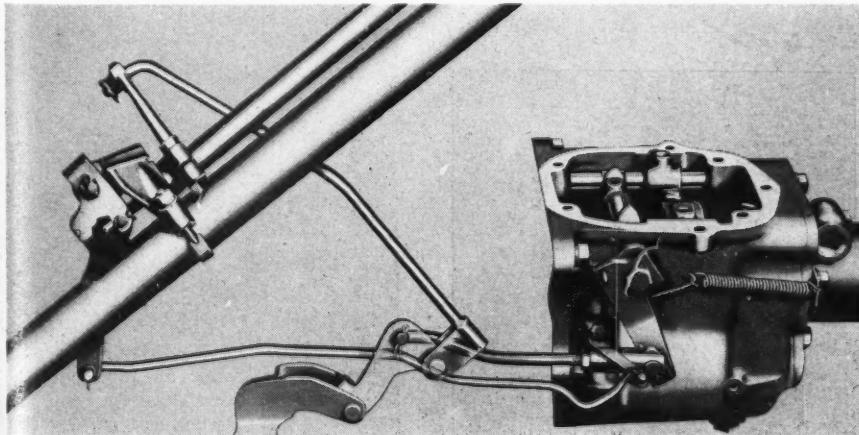
Starting serial number 1001. Six cylinder, $3\frac{1}{2} \times 4\frac{1}{8}$ in. Displacement 238.1 cu. in. Maximum brake hp. 100 at 3400 r.p.m. Compression ratio 6.1 to 1 standard, with 5.74 to 1 optional. Compression pressure 115 lb. at cranking speed. Firing order 1-5-3-6-2-4. Tighten cylinder head bolts to 60-70 ft.-lb.

Pistons

Aluminum alloy, T-slot cam ground. Furnished for service with pins fitted. Install in engine with mark "VS" on head of piston toward valve side of engine. Fit in cylinder to .002 in. clearance on thrust side of piston. Removed from above.

Connecting Rods

Steel back babbitt, slip-in type bearing. Install in engine with oil spray hole toward camshaft side of engine.



Tighten bearing cap bolts to 50-55 ft.-lb. tension.

Valves

Valve seat angle, intake 30 deg., exhaust 45 deg. Valve spring pressure $50\frac{1}{2}$ lb. when compressed to $2\frac{1}{4}$ in. Operating tappet clearance, intake .008 in., exhaust .011 in. Install valve spring dampers in upper end of spring.

Valve Timing

Valves are in time when punch marks of camshaft and crankshaft sprockets are together and in line with shaft centers.

Main Bearings

Steel back babbitt, slip-in type. Upper and lower halves are interchangeable except the front bearing which has a short oil groove leading forward from the center groove.

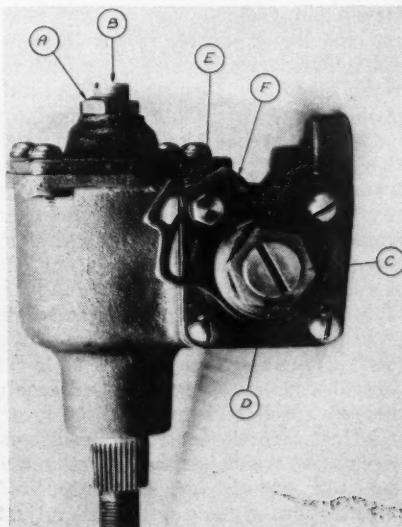
Tighten bearing cap bolts to 100 ft.-lb. tension on No. 1, 2 and 3 bearings, and 140 ft.-lb. on No. 4 bearing.

Steering

Saginaw worm and roller, Model 420-D-119. To remove end play in Pitman arm shaft, loosen lock nut "A" and turn screw "B" to right just enough to remove end play. To remove worm shaft end play, loosen lock nut "C" and tighten adjusting screw "D" until slight drag is felt in steering wheel when turning through extreme range of travel. To adjust backlash between worm and roller, loosen lock screw "E" and tap lash adjuster "F" lightly with hammer in direction of arrow, tightening just enough to remove lash but not enough to cause tight spots. There should be no backlash between worm and roller when steering gear is in center position.

Hand Brake Adjustment

Disconnect hand brake cables at equalizer link. Remove adjusting hole covers and expand rear wheel brakes by turning notched adjusting wheel until heavy drag is felt on drums. Pull brake cables forward to remove all slack and adjust cables so that clevis pin will enter both clevises and the equalizer link when the link is parallel with propeller shaft. Install clevis pin with head end on top of clevis. Back off notched adjusting wheel 20 notches at each wheel.



Eight

Engine

Starting serial number 1001. Eight cylinder $3\frac{1}{4} \times 3\frac{3}{8}$ in. Displacement 257.1 cu. in. Maximum brake hp. 110 at 3600 r.p.m. Compression ratio, standard, 6.3 to 1; optional ratio 5.7 to 1. Compression pressure 107 lb. at cranking speed. Firing order 1-6-2-5-8-3-7-4. Tighten cylinder head bolts to 60-70 ft.-lb. tension.

Valves

Operating tappet clearance, intake .008 in., exhaust .011 in.

Hydra-Matic Drive

Should it be necessary to start the engine by pushing the car equipped with Hydra-Matic drive, place gear shift lever in neutral until car speed of approximately 20 m.p.h. is reached, and then move shift lever to "Hi" position. When towing a Hydra-Matic equipped car, place gear shift lever in neutral position.

Hydra-Matic Drive Fluid

Fluid should be drained at end of first 5000 miles, and at 10,000-mile intervals thereafter. Drain by removing drain plugs in bottom of transmission oil pan and in front side of flywheel. Nine quarts of Hydra-Matic fluid required for refill. Dip stick for checking fluid level reached through opening in front floor pan.

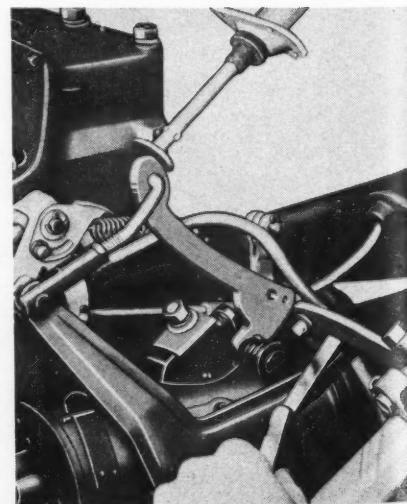
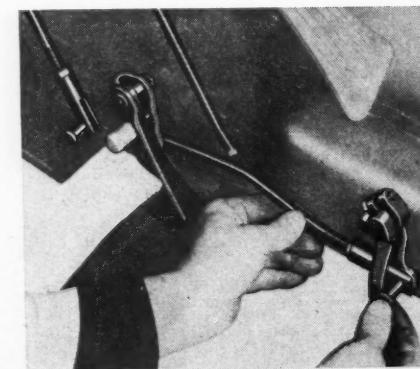
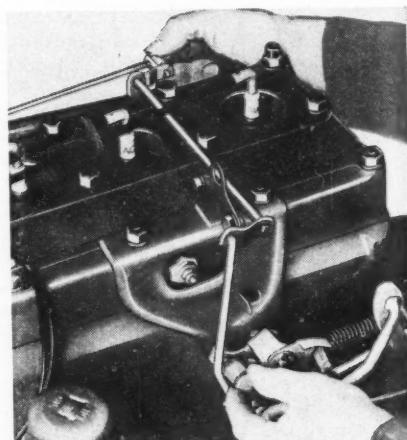
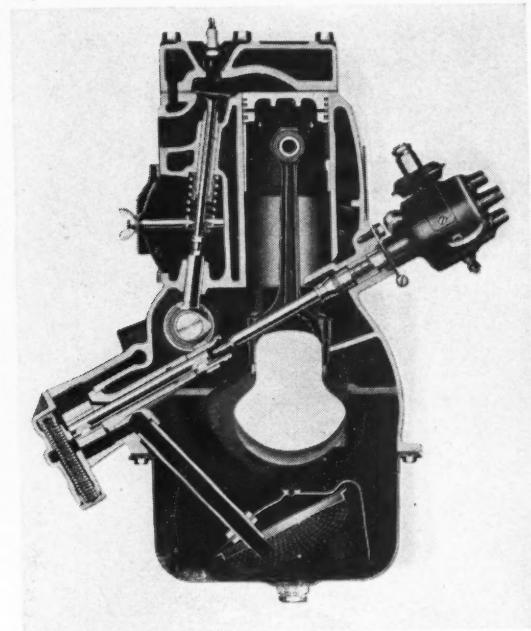
Hydra-Matic Control Adjustment

Adjust manual control — remove clevis pin from lower control relay rod and lower control rod at intermediate lever. Move shift lever into reverse position. Line up hole in intermediate lever with hole in bracket and insert pin to hold lever in this position. Move shift lever on side of transmission as far back as it will go (extreme reverse position) and adjust length of lower relay control rod so clevis pin will enter freely front end of relay. Remove pin rod in intermediate lever hole from intermediate lever and bracket. Hold relay rod toward rear and adjust clevis of lower control rod so pin will enter freely through clevis and intermediate lever.

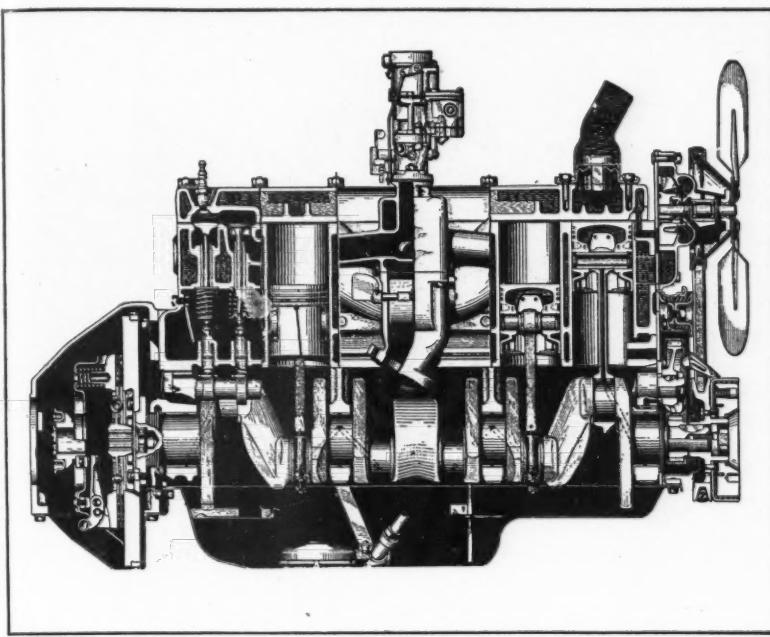
Adjust throttle control rod—disconnect rod at transmission end. Remove lock nut on end of carburetor rod (right side of engine) and adjust

length of carburetor rod (with engine idling at 375 r.p.m.) so that pin will enter holes in bellcrank and bracket. Install and tighten carburetor rod lock nut. Hold throttle lever at transmission all the way back, and with carburetor in slow idle position adjust length of throttle rod so clevis pin slips freely through clevis and lever. Then shorten rod one full turn of clevis, install clevis pin and cotter pin, and tighten clevis lock nut. Adjust accelerator pedal idler lever to bellcrank rod to give $3/32$ to $5/32$ in. clearance between lever and bead on under side of toe pan, with carburetor on slow idle.

.060 in. clearance between arm on starter interlock bellcrank and control shaft shift lever.



Model 110

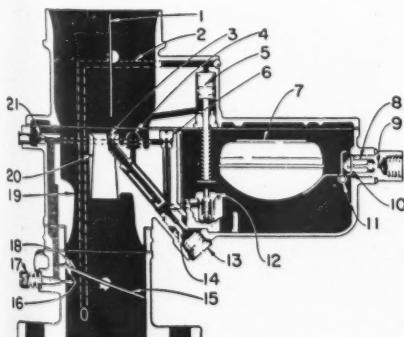


Engine

Starting serial number D1551. Six cylinder $3\frac{1}{2} \times 4\frac{1}{4}$ in. Displacement, 245 cu. in. Taxable hp. 29.4. Brake hp. 100 at 3600 r.p.m. Compression ratio standard 6.39 to 1, optional 6.71 to 1. Firing order 1-5-3-6-2-4. Tighten cylinder head stud nuts to not less than 740 in.-lb. or more than 760 in.-lb.

Pistons

Piston and rod assemblies are installed through the top of the block. When reinstalling rods and pistons, oil squirt holes and piston slots must be on camshaft side of engine. Heat pistons to 160 deg. when installing new pins, which should then have a finger push fit. Correct piston fit is when a .0015 in. feeler, $\frac{1}{2}$ in. wide, requires 12 to 18 lb. to withdraw.



Bearings

Rod and main bearings are of the steel backed, babbitt lined type and are non-adjustable. Main bearings

may be removed without removing crankshaft. No cotter pins are used on rod bearing cap bolts. To lock, tighten regular nut to desired tension, spin on pin nut with smooth surface contacting regular nut and then tighten $\frac{1}{4}$ to $\frac{1}{3}$ turn tighter.

Valves

Correct tappet clearance is .007 in. for the inlet and .010 in. for the exhaust. Make adjustments with engine warm and running. Tappet screws are of the self-locking type. Valve spring pressure 114 to 124 lb. at $1\frac{5}{16}$ in. Valve seat angles 30 deg. for inlet and 45 deg. for exhaust.

Valve timing is correct when marks on sprockets are brought together and in line with the centers of the shafts. Inlet valve opens one deg. before top center with the tappet set at .013 in.

Carburetor

Stromberg Model BXOV-26. Turn idle adjustment needle out for richer mixture. Standard adjustment is 1 to $1\frac{1}{2}$ turns open. Fuel level is $\frac{5}{8}$ in. below machined top surface of the float bowl with 3 lb. fuel pressure. Leaking power by-pass (economizer valve) will cause excessive fuel consumption. If mileage improves after clogging jet, it indicates that the economizer valve is leaking.

Distributor

Auto Lite IGC 4505. Breaker point gap .018 to .022 in. Spring tension 19 to 23 oz. Cam angle 38 deg. Centrifugal advance 3 deg. at 590 r.p.m.

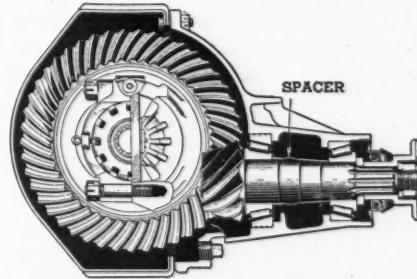
full advance of $9\frac{1}{2}$ deg. at 1600 r.p.m. Full vacuum advance of $7\frac{1}{2}$ deg. at 17 in. vacuum. Breaker points open 6 deg. before top center. Timing marks on vibration damper. Firing order 1-5-3-6-2-4.

Spark Plugs

Either AC-104, or Champion Y-4. Correct gap .028 in. Tighten plugs to 50 in.-lb. tension.

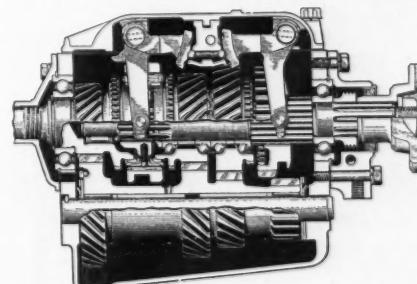
Generator

Auto Lite GDZ-4801 with current and voltage regulator. Maximum output 35 amp. at 8 volt. Field current 1.6 to 1.88 amp. at 6 volts.



Current and Voltage Regulator

Auto-Lite VRP 4002-C. Armature air gap .048 to .052 in. Contact point gap .012 in. Operating voltage 7.2 to 7.4 volts, operating current 34 to 36 amp. Some models equipped with Delco 1118202 unit—armature air gap .070 in., operating voltage 7.2 to 7.4 volts, operating current 32 to 34 amp.



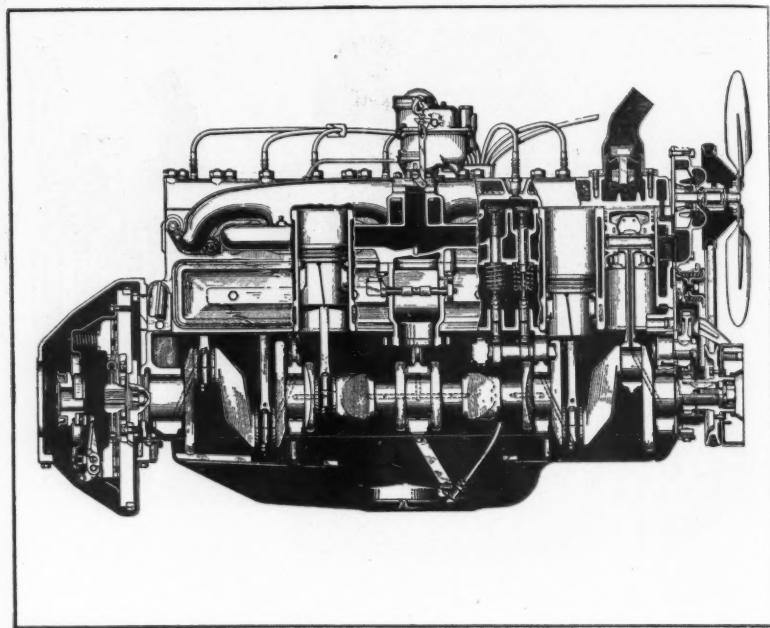
Rear Axle

Pinion shaft bearings should be adjusted to a preload drag of 25 to 30 in.-lb. To adjust, draw up the self-locking flange nut until you feel the spacer start to buckle. Check scale pull required to rotate pinion shaft. If pull is less than 25 in.-lb. tighten nut further until correct drag is obtained.

Model 120

Engine

Starting engine number D300051. Eight cylinder $3\frac{1}{4} \times 4\frac{1}{4}$ in. Displacement 282 cu. in. Taxable hp. 33.8. Brake hp. 120 at 3600 r.p.m. Standard compression ratio 6.41 to 1. Optional compression ratio 6.85 to 1. Firing order 1-6-2-5-8-3-7-4. Tighten cylinder head nuts to not less than 740 in.-lb. or more than 760 in.-lb.

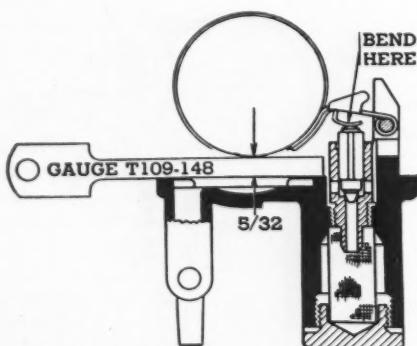


Pistons

Piston and rod assemblies are installed through the top of the cylinder block. When installing rods and pistons, oil squirt holes and piston slots must be placed on camshaft side of the engine. Heat pistons to 160 deg. when installing new pins, which should then be a finger push fit. Correct piston fit is when a .0015 in. feeler $\frac{1}{2}$ in. wide requires 12 to 18 lb. to be withdrawn.

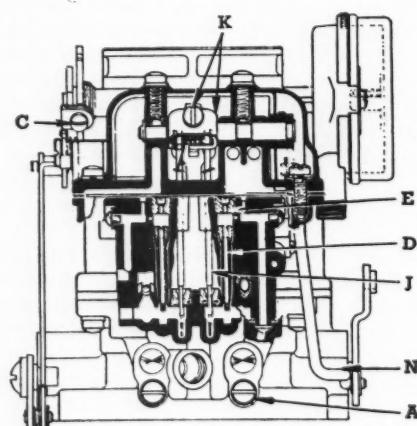
Distributor

Auto-Lite Model IGP-4502. Breaker point gap .012 to .017 in. Point tension 19 to 23 oz. Centrifugal advance 3 deg. at 525 r.p.m., $1\frac{1}{2}$ deg. at 1550 r.p.m. Vacuum advance 6 deg. at 17 in. of vacuum. Cam angle 27 deg. Breaker points open 7 deg. before top center. Use same timing for both standard and high compression head. Timing marks are on vibration damper.



Carburetor

Carter model 478 S. Turn idle adjusting screws out for richer mixture. Normal adjustment $\frac{1}{2}$ to $1\frac{1}{4}$ turns open. Adjust float level as indicated in illustration. Adjust metering rods by means of gage No. T109-113.



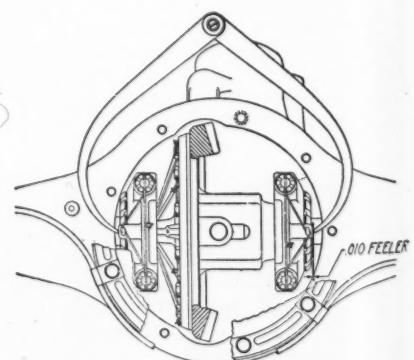
Spark Plugs

Either AC 104 or Champion Y-4. Set gaps to .028 in. Tighten plugs to 50 in. lb. with tension wrench.

Generator

Auto-Lite GDZ-4801 with current and voltage regulator. Maximum output 35 amp. at 8 volts. Field current 1.6 to 1.88 amp. at 6 volts.

in. lb. To adjust: draw up the self-locking flange nut until you feel the spacer start to buckle. Check scale pull required to rotate pinion shaft. If pull is less than 25 in. lb. tighten nut further until desired drag is obtained. If preload exceeds 30 in. lb. install a new sleeve and readjust. Readjust preload every time universal joint flange nut is loosened. Differential side bearings should be preloaded to .010 to .012 in. spread of bearing support pedestals. To adjust: loosen each side bearing cap, then back off the right hand bearing adjusting nut until ring gear mount is loose in bearing.



Current and Voltage Regulator

Auto-Lite VRP 4002-C. Armature air gap .048 to .052 in. Contact point gap .012 in. Operating voltage 7.2 to 7.4. Operating current 34 to 35 amp.

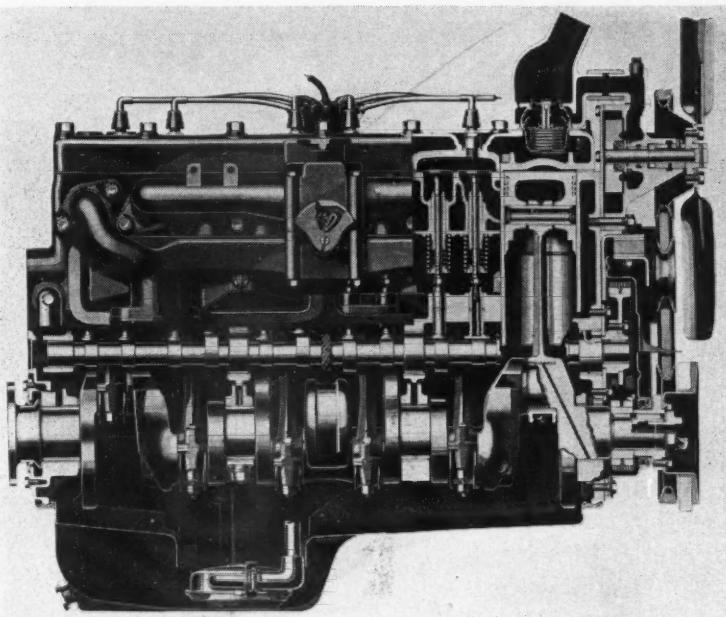
Rear Axle

Pinion shaft bearings should be adjusted to a preload drag of 25 to 30

ings. Make sure that left hand adjusting nut is backed out far enough to provide some backlash between pinion and ring gear. Using a large caliper and a .010 in. feeler gage, caliper from one cap boss to the other with the feeler between one of the machined bosses and the caliper. Then tighten right hand adjusting nut until the caliper without the feeler will just slide over the bosses.

1941 PLYMOUTH

P-11 and P-12

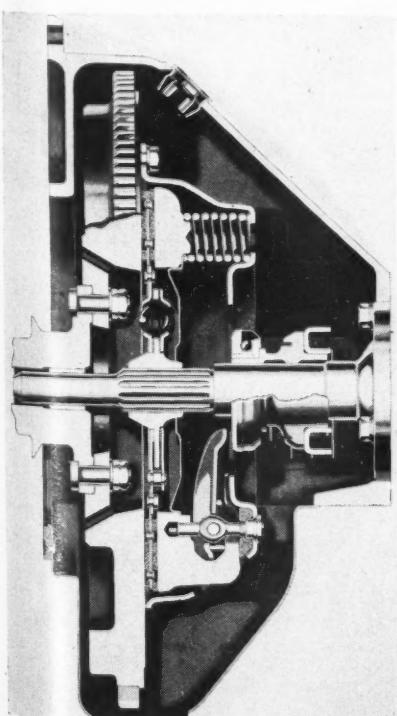


Engine

Starting serial number 15,000,101 for P-11, 11,123,001 for P-12. Six cylinder, $3\frac{1}{2}$ x $4\frac{1}{8}$ in. Displacement 201.3 cu. in. Maximum brake h.p. 87 at 3800 r.p.m. Compression ratio 6.7 to 1. Compression pressure 114 lbs. at cranking speed. Firing order 1-5-3-6-2-4. Tighten cylinder head bolts to 65-70 ft. lbs. tension.

Pistons

Aluminum alloy, U-slot, cam



ground. Fit in cylinder with .002 in. clearance between cylinder wall and thrust side of piston.

Connecting Rods

Steel back, babbitt, slip-in type bearing. Connecting rods are offset at bearing end—install in engine with long side of bearing toward front in cylinders 2, 4 and 6; long side of bearing toward rear in cylinders 1, 3 and 5—install with oil spray hole toward camshaft side of engine. Tighten nuts to 45-50 ft.-lb.

Main Bearings

Steel back, babbitt, slip-in type. Upper and lower halves of bearings are not interchangeable—shell with oil hole is upper half of bearing. Tighten bearing cap nuts to 75-80 ft.-lb., and cap screws to 80-85 ft.-lb.

Remove Front Bearing Cap

Remove oil pan, clutch housing pan and oil pump strainer. Remove crankshaft pulley splash shield. Remove the two lower screws from the timing chain case cover to the oil pan front end oil seal plate, and remove the plate. Remove bearing cap.

Valves

Valve seat angle, 45 deg. Valve spring pressure 40-45 lb. when compressed to $1\frac{1}{4}$ in. Operating valve tappet clearance, intake .008 in., exhaust .010 in.

Valve Timing

Valves are properly timed when punch marks on camshaft and crankshaft sprockets are together and in line with shaft centers.

Distributor

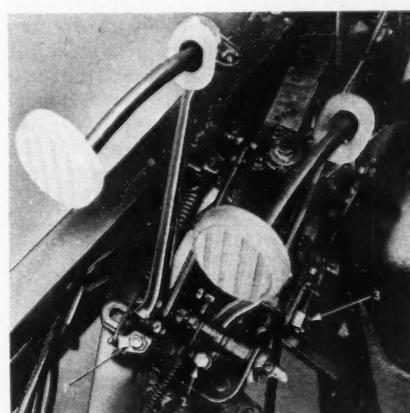
Auto-Lite Model IGS-4111-1. Centrifugal and vacuum advance. Maximum advance 22 deg. at 3650 r.p.m. Cam angle 38 deg. Breaker point gap .020 in. Breaker arm spring tension 17-20 oz.

Ignition Timing

Timing marks on fan drive pulley. Shift distributor so that spark occurs at top center, or when pointer on timing case cover lines up with "DC" mark on fan drive pulley.

Clutch Pedal

Adjust pedal stop screw lock nut so that pedal just clears underside of floor board. Adjust shifter fork rod adjusting nut to allow 1 in. free pedal travel.



Automatic Choke Adjustment

Remove air cleaner. Pull hand throttle out $\frac{1}{4}$ of its travel. Move automatic choke lever until the hole in the shaft lines up with slot in housing, and put a pin through the shaft and into the slot to hold the shaft in this position. Loosen the clamp screw in the automatic choke lever and push the choke valve closed. Tighten the lever clamp screw.

PONTIAC 1941

Six

Engine

Six cylinder 3 9/16 x 4 in. Displacement 239.2 cu. in. Taxable hp. 30.4. Brake hp. 90 at 3200 r.p.m. Compression ratio 6.5 to 1. Compression pressure 155 lb. at 1000 r.p.m. Compression ratio of 7.5 to 1 optional. Firing order 1-5-3-6-2-4. Tighten cylinder head bolts to 60 ft. lb.

Pistons

Chrome nickel alloy. Correct clearance when 10 to 20 lb. pull is required to pull .0015 in. feeler ½ in. wide. Piston assemblies removed through top of block.

Engine Removal

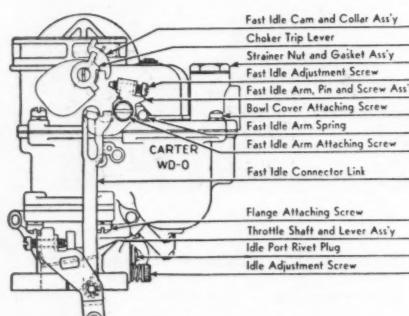
Necessary to remove front bumper, radiator and fenders.

Cooling System

In cases of overheating on engines with high mileage, check water distributing tube in cylinder block. Closed end of this tube goes to rear of block.

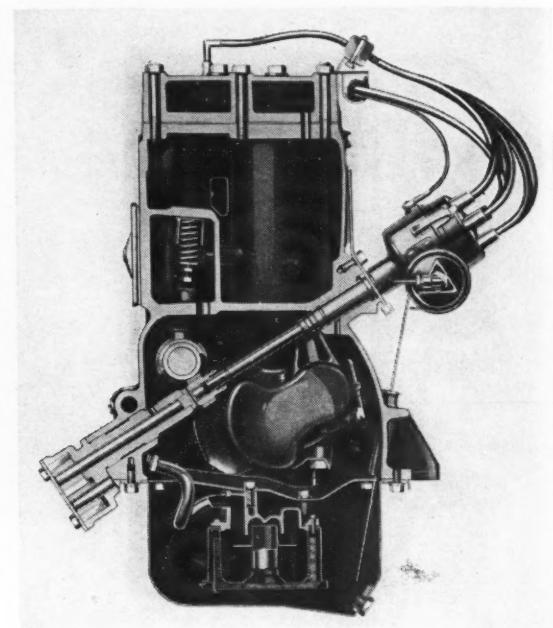
Main Bearings

Replaced without removing engine. Bearings are non-adjustable and caps should be tightened to 85 ft. lb. To install rear main bearing oil seal it is necessary to remove engine and then the crankshaft from the block. The formed asbestos seal is compressed into the rear groove of the block and the bearing cap. Seal should be cut off flush with cap and block.



Carburetor

Carter model 494S. Use gage T-109-102 when checking metering rod setting. Normal vacuum gage reading is 18 to 20 in. with engine idling. Correct idle is 450 to 475 r.p.m. Float level is 7/16 in. measured from the



top of the projection on the bowl cover to the top of the soldered seam at the free end of the float, with the needle seated.

Front Wheel Alignment

Caster ¾ deg. Camber zero. King pin inclination 4 ½ to 4 ¾ deg. Toe-in zero to 1/16 in. measured 9 in. from floor. Toe-out—with one wheel turned to 20 deg., other wheel should be 22 ½ to 23 ½ deg. Caster and camber adjusted by means of eccentric pin. To adjust loosen steering knuckle support clamp bolt, remove lubrication fitting from the front bushing of the eccentric pin and then turn eccentric pin by means of an Allen wrench.

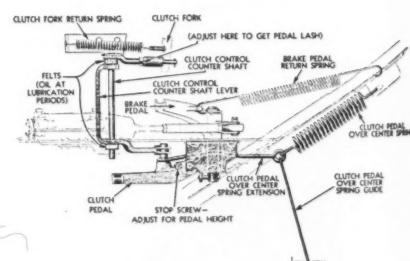
Axle Shaft

To remove axle shafts, remove wheel and brake drum. Also remove nuts from four bolts attaching backing plate to axle housing. Then withdraw axle shafts by means of a pulley bolted to studs in axle shaft plate.

Distributor

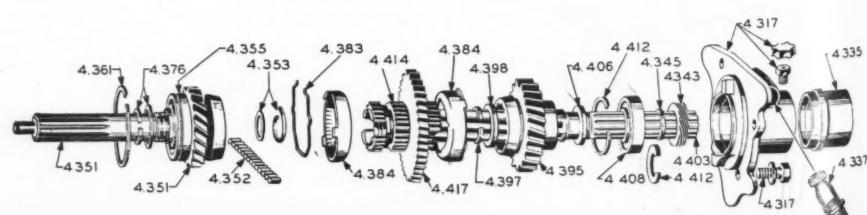
Delco Remy distributor model 647D. Breaker point gap .021 in. Spring tension 17 to 21 oz. Cam angle 35 deg.

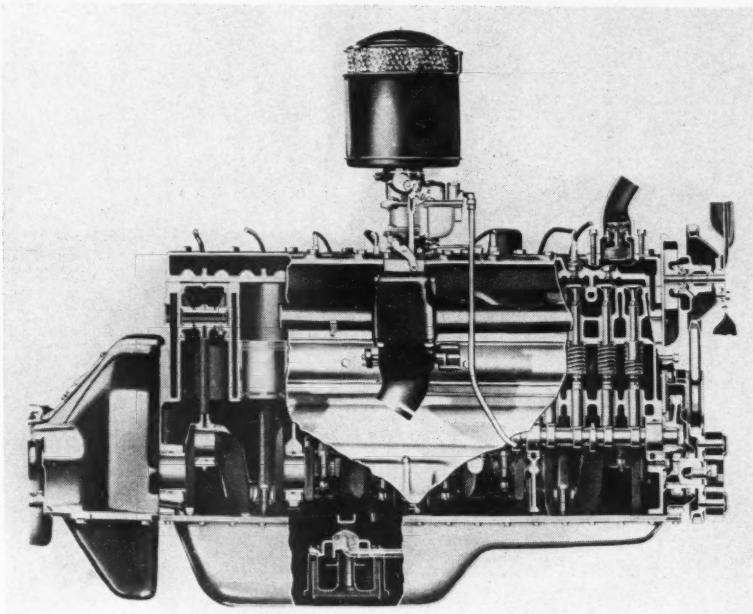
Breaker points open 4 deg. before top center. Timing marks on flywheel. Automatic spark advance zero to 4 deg. at 800 r.p.m., 3.75 to 7.75 deg. at 1200 r.p.m., 12.5 to 16.5 at 2400 r.p.m., 23 to 28.5 deg. at 4000 r.p.m. Seven to 9 in. of vacuum to start movement of breaker plate, 13 to 16 in. vacuum for 13 deg. spark advance and full vacuum advance at 17 deg. Standard spark plug AC type 45, gap .025 in.



Valves

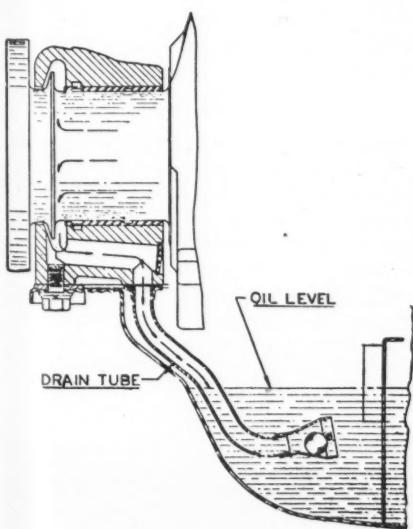
Correct tappet clearance .011 to .013 in. Valve spring pressure 97 to 105 lb. at 1 19/32 in. long and 56 to 63 lb. at 1 29/32 in. long. Install springs with the two closed coils at the top and the single closed coil at the bottom.





Engine

Eight cylinder $3\frac{1}{4} \times 3\frac{3}{4}$ in. Displacement 248.9 cu. in. Taxable hp. 33.8. Brake hp. 103 at 3500 r.p.m. Compression ratio 6.5 to 1; optional 7.5 to 1. Standard compression pressure 155 lb. at 1000 r.p.m. Firing order 1-6-2-5-8-3-7-4. Tighten cylinder head bolts to 60 ft. lb.



Pistons

Chrome nickel alloy. Correct clearance when 10 to 20 lb. pull is required to pull .0015 in. feeler $\frac{1}{2}$ in. wide. Piston assemblies removed through top of block.

Main Bearings

Replaceable without removing engine from chassis. Bearings are non-adjustable and caps should be tight-

ened to 85 ft. lb. There is no bearing packing used on rear main bearing.

Connecting Rods

Nonadjustable and replaceable type. Tighten cap bolts to 45 ft. lb. Cap bolt nuts of self locking type and do not require cotter pins.

Valves

Correct tappet clearance .011 to .013 in. Valve spring pressure 97 to 105 lb. at $1\frac{19}{32}$ in. long and 56 to 63 lb. at $1\frac{29}{32}$ in. long. Install springs with two closed coils at the top and the single closed coil at the bottom. Valve spring dampers are installed at the top of the springs.

Carburetor

Carter model 469SM. Use gage T-109-27 when checking metering rod setting. Normal vacuum reading 18 to 20 in. with engine idling. Correct idle is 450 to 475 r.p.m. Float level should be $5\frac{1}{16}$ in. measured from machined surface of cover to float with float lip resting on needle. Approximate setting for idling mixture $\frac{1}{2}$ to $1\frac{1}{4}$ turns open. Accelerator pump should travel $19\frac{1}{64}$ in., adjust by bending throttle connector rod at the lower angle.

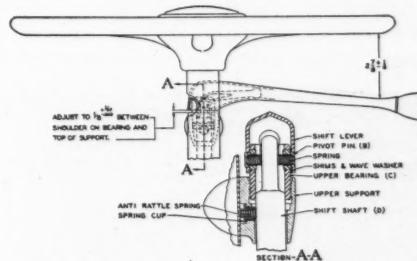
Front Wheel Alignment

Caster $\frac{3}{4}$ deg. Camber zero. King pin inclination $4\frac{1}{2}$ to $4\frac{3}{4}$ deg. Toe-in zero to $1\frac{1}{16}$ in. measured 9 in. from floor. Toe-out—with one wheel turned to 20 deg., other wheel should be $22\frac{1}{2}$ to $23\frac{1}{2}$ deg. Caster and camber adjusted by means of eccentric pin. To

adjust: loosen steering knuckle support clamp bolt, remove lubrication fitting from the front bushing of the eccentric pin and then turn eccentric pin by means of Allen wrench.

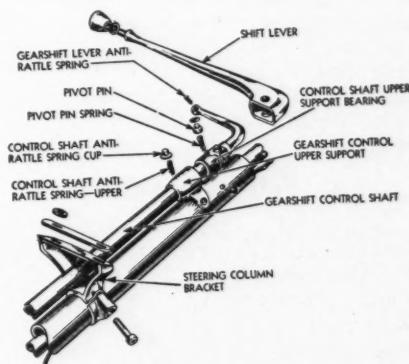
Transmission Shift

Adjust upper bearing C to obtain $\frac{1}{32}$ in. clearance between shoulder on control shaft upper bearing and the top of the support. One-half turn will increase this $1\frac{1}{32}$ in. To adjust shift lever position in relation to steering wheel rim, loosen adjusting bolt which clamps the selector control and idler lever together, move shift lever to desired position while holding the selector rod in the 2nd and 3rd position and then tighten bolt.



Generator and Regulator

Delco Remy model 1102665. Maximum charging rate 34 amp. at 8 volt and 2400 r.p.m. Regulator model 1118201. With generator at 3000 r.p.m. adjust regulator voltage to 7.2 to 7.4 volts (with 8 to 10 amp. charg-



ing rate) and unit at operating temperature and cover in place. Air gap .070 to .075 in. between armature and center of core with points just closing.

Champion

Engine

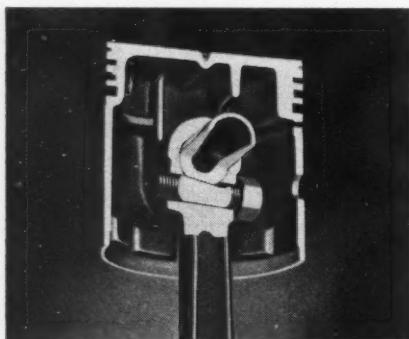
Six cylinder, 3 x 4 in. Displacement 169.6 cu. in. Maximum brake hp. 80 at 4000 r.p.m. Compression ratio 6.5 to 1. Compression pressure 105 lbs. at cranking speed. Tighten cylinder head cap screws to 50-55 ft. lbs. tension.

Pistons

Aluminum alloy, split skirt, cam ground. Install in cylinder with slot away from camshaft side of engine. Fit to .002 in. clearance on thrust side of piston.

Removing Piston Pins

Pin held in connecting rod by tapered pin with a nut on each end. End of tapered pin having screw driver slot is the big end. To remove the tapered pin from the rod, remove the lock nut from the plain end and



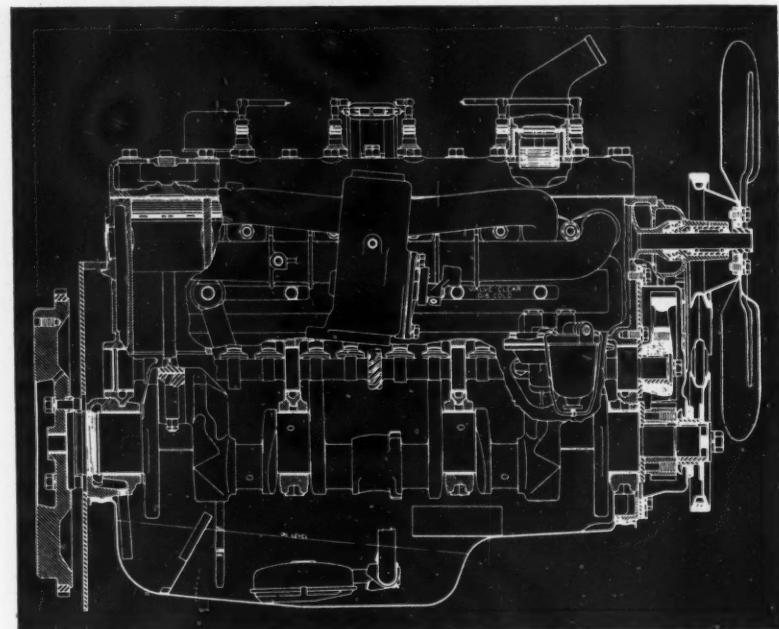
tighten the lock nut on the slotted end—this will draw the tapered pin out of the rod. When installing, remove both nuts from tapered pin, insert pin in rod with slotted end up, then install nut on plain end and tighten, drawing pin into rod. When tight, install nut on slotted end and tighten.

Valve Timing

Intake valve opens 15 deg. or 5 flywheel teeth before top center, as indicated by "IN OP" mark on flywheel. Punch-marked tooth of camshaft gear should index between two punch-marked teeth of crankshaft gear when valves are properly timed.

Generator

Auto-Lite, Model GDZ 4804A. Current and voltage regulator. Maximum output 35 amps. at approximately 18



m.p.h. Cutout relay points close at 6.4 to 6.6 volts. Air gap for current and voltage regulator .048 to .052 in.

Connecting Rods

Babbitt bearing, spun in rod—not adjustable. Rods are offset, and are marked on the oil spray hole side with the cylinder number in which they fit. Install in engine with oil spray hole toward camshaft side of engine. Tighten rod bearing cap nuts to 25 ft. lb. tension. Palnuts used in place of cotter pins.

Distributor

Auto-Lite, Model IGW-4154. Maximum advance 14 deg. at 2800 r.p.m. Centrifugal and vacuum advance. Breaker point gap .020 in. Breaker arm spring tension 17-20 oz. Cam angle 35 deg.

Ignition Timing

Timing marks on flywheel. Adjust distributor so that spark occurs when the IGN mark on the flywheel lines up with the pointer at the timing hole in the left side of the flywheel housing.

Main Bearings

Steel back, babbitt, slip-in type. Tighten main bearing cap screws to 90 ft. lbs. tension.

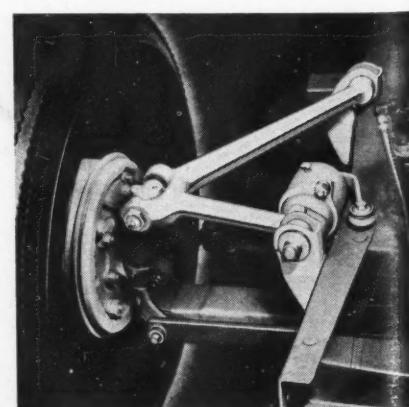
Transmission Shift

To adjust the transmission gear shift, disconnect the shift rods at the transmission levers. Pry out the plug

in the side of the shift box at the bottom on the steering column and block the notched levers together with the gear shift lever at the steering wheel in the neutral position. Move the shift levers at the transmission by hand to be sure they are in neutral positions. Adjust the clevis on the shift rod so that clevis pins will enter through clevis and shift lever without moving lever.

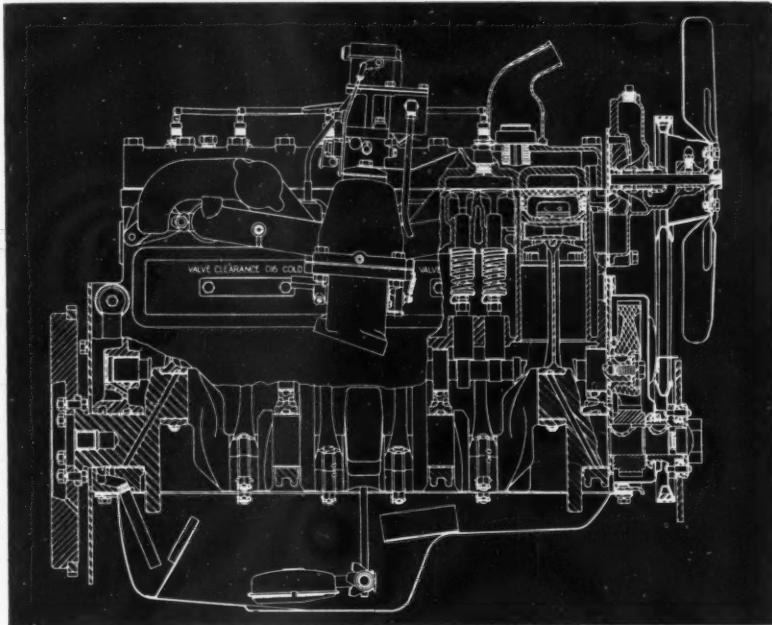
Overdrive

The cut-in speed of the overdrive unit can be adjusted by turning two screws in the overdrive clutch which control the spring tension of the lock pawls. These screws can be reached through the transmission drain plug hole. Tightening the screws increases the car speed at which the cut-in occurs; loosening the screws lowers the car speed at which the overdrive cuts in.



1941 STUDEBAKER

Commander



Engine

Six cylinder, 3 5/16 x 4 3/8 in. Displacement 226.2 cu. in. Maximum brake hp., 94 at 3600 r.p.m. Compression ratio, 6.5 to 1 standard, 7 to 1 optional. Compression pressure 105 lbs. at cranking speed with standard head. Tighten cylinder head cap screws to 85 ft. lbs. tension.

Pistons

Aluminum alloy, T-slot, cam ground. Install in engine with slot away from camshaft side of engine. Fit in cylinder with .002 in. clearance at thrust side of piston.

Connecting Rods

Babbitt, spun bearing, not adjustable. Rod bearings are offset, and should be installed in the cylinder corresponding to the number stamped on the rod, and with the oil spray

hole toward the camshaft side of the engine. Tighten bearing cap nuts to 55 ft. lbs. tension. Palnuts used instead of cotter pins.

Main Bearings

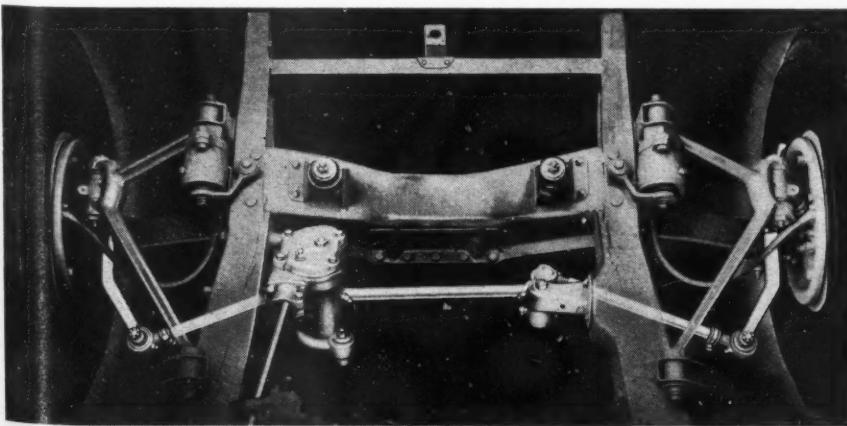
Steel back, babbitt, slip-in type. Tighten main bearing cap screws to 90 ft. lbs. tension.

Starter

Auto-Lite, Model MAW-4020. Starter button operated by depressing clutch pedal. Bendix starter drive.

Distributor

Auto-Lite, Model IGW-4101. Centrifugal and vacuum advance. Maximum advance 20 deg. at 1400 r.p.m. Breaker point gap .020 in. Breaker arm spring tension 17-20 oz. Cam angle 35 deg.



Ignition Timing

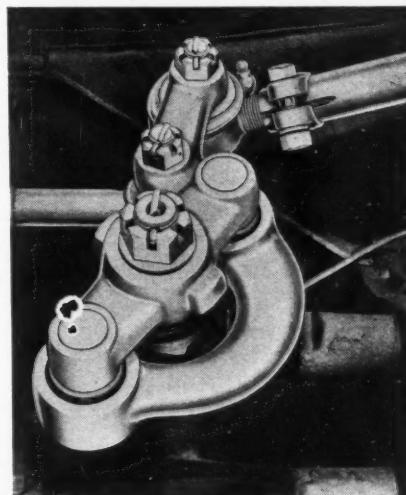
Timing marks on vibration damper. Adjust distributor so spark occurs 2 deg. or $\frac{1}{4}$ flywheel tooth before top center, or when IGN mark on vibration damper lines up with pointer on timing case cover.

Spark Plugs

Champion, Type J8. Spark plug gap .022 to .027 in.

Generator

Auto-Lite, Model GD2-4805-A. Vibrating type current and voltage regulator. Maximum charging rate 35 amps. at 7.3 volts. Cutout relay points close at 6.4 to 6.6 volts, and open at 4 to 6 volts reverse current. Air gap .034 to .038 in.



Front Wheel Alignment

Caster angle, minus $\frac{1}{4}$ to $\frac{3}{4}$ deg. not adjustable, and is controlled by the relation of the front spring to the frame. Camber angle, $\frac{1}{4}$ to $\frac{3}{4}$ deg. Adjust by removing or installing shims between the steering knuckle support arm upper brackets and the frame. Toe-in is $1/16$ to $\frac{1}{8}$ in. Adjust by first setting steering gear on its center point. Put chalk mark on tread of left rear tire, 1 in. in from the outer sidewall. Sight along the outer sidewall of the left front tire and adjust the left tie rod to bring the chalk mark in line, and then tighten the clamp bolts of the left tie rod. Adjust the right tie rod to give the desired toe-in—this puts all of the toe-in on the right front wheel.

Americar

Engine

Four-cylinder 3 $\frac{1}{8}$ x 4 $\frac{1}{8}$ in. Piston displacement 134.2 cu. in. Taxable hp. 15.6. Compression ratio 6.48 to 1. Compression pressure 111 lb. at cranking speed with wide open throttle. Optional compression ratio 6.1 to 1 with cast iron head, 7.0 to 1 with aluminum head. Firing order 1-3-4-2.

Carburetor

Carter model WO-507-S. Idle adjustment $\frac{1}{2}$ to 1 $\frac{1}{2}$ turns open. For richer mixture turn screw out. Float setting $\frac{3}{8}$ in. from free end of float to float chamber cover with needle valve closed. Pump adjustment: Back out throttle lever set screw with throttle valve seated; pump should travel 7/32 in. at full throttle position. Adjustment made by bending throttle connector rod at lower angle. Metering rod adjustment: Use gage No. T109-26.

Connecting Rods

Rod and piston assemblies removed through top of block. Install rods so that short side of offset is toward nearest main bearing. Oil spray hole should be toward right side of motor.

Valve Timing

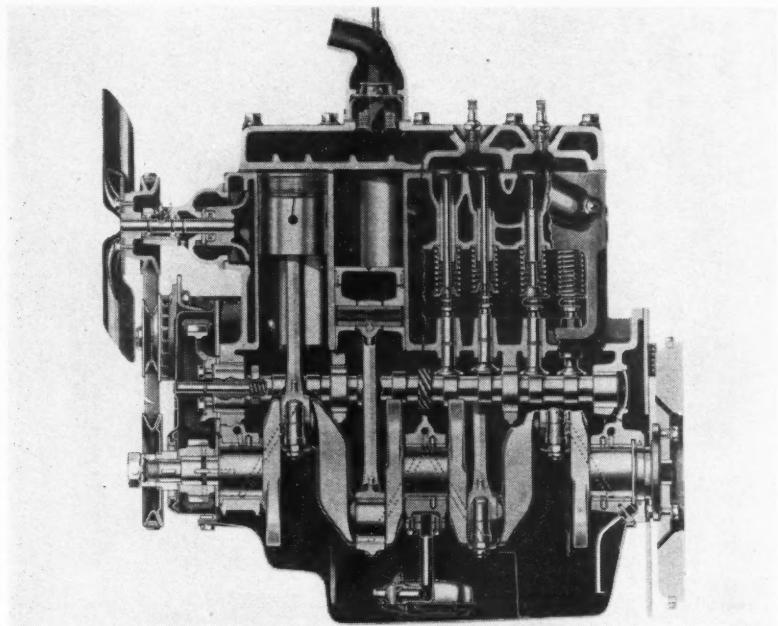
With tappets set at .020 in. intake valve opens 9 deg. or 2 $\frac{1}{2}$ flywheel teeth or .039 in. before TC, exhaust valve closes 12 deg. or .054 in. or 3 $\frac{1}{4}$ flywheel teeth after TC. Flywheel marks viewed through inspection hole at right side of flywheel housing at front. Timing chain is installed correctly when, with No. 1 and No. 4 pistons at TC a line drawn through sprocket centers passes through timing marks on both sprockets.

Engine Mounting

Front mounting adjustment is controlled by the lower nut which should be turned up until the lower snubbing rubber expands about $\frac{1}{8}$ in. or compressed enough so that it is hard to turn.

Distributor

Auto-lite model IGW-4129. Breaker point gap .020 in. Cam angle 41 deg. Maximum automatic advance 18 to 20



deg. Maximum vacuum advance 18 to 22 deg.

With No. 1 piston on compression stroke breaker points should open when "IGN" mark on flywheel lines up with timing indicator.

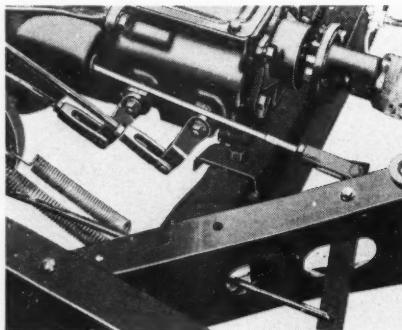
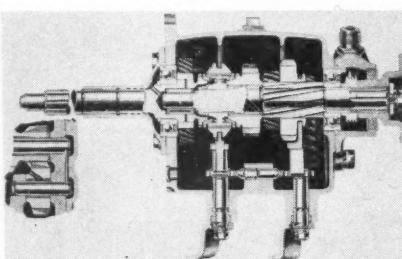
Transmission and Clutch Removal

Disengage accelerator pedal rod. Remove right then center toe boards. Loosen radiator to body brace rod and radiator hold down nuts. Disconnect propeller shaft at front end. Disconnect speedometer cable and shift rods. Remove lower nuts from rear mount-

ing bolts at transmission. Jack up rear of engine until mounting bracket at rear of transmission can be removed. Raise transmission with jack until engine clears cross member. Remove bell housing to motor bolts. If aligning bolts are driven in from rear reverse them and drive in from front to hold motor plate in position and make bell housing assembling easier. Remove transmission from top.

Transmission Gear Shift

If shift is not smooth and positive place gears in neutral position, then remove shift rods at transmission end. Slip a short piece of $\frac{1}{4}$ in. drill rod through the alignment holes in gear shift lever to insure correct neutral position of the clutch and shift lever assemblies. Adjust shift rod yokes so that clevis pins can be slipped into place freely without forcing the shift levers in either direction. After which pull out the $\frac{1}{4}$ in. alignment pins. Remove lubricating fitting in shifter housing at bottom of steering post. Clearance between faces of shift clutches should be .015 in. to .031 in. Cross pin dog which engages clutch slots should not have more than .009 in. clearance in slots.



Operating Tappet Clearance

With engine cold adjust both intake and exhaust tappets to .014 in.

Wheel Alignment

Caster 3 deg. Camber 2 deg. Toe-in 1/16 to $\frac{1}{8}$ in. King pin inclination 7 $\frac{1}{2}$ deg.

Tune Up Specifications—(1936 to 1941 Inclusive)

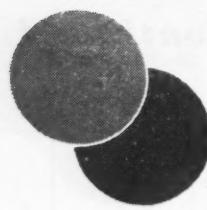
MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES				Rods Removed from	IGNITION				Capacity Crank Case (Qts.)	CRANK- PIN		FRONT AXLE			Kingpin Inclination (Degrees)				
		Inlet Tappet Clearance for Valve Timing		Intake Valve Opens Before or After T. C.			Operating Tappet Clearance		Spark Plug			Timing		Diameter	Length	Caster (Degrees)	Camber (Degrees)				
		No. of Degrees (E=Exhaust Valve)	No. of Flywheel Teeth (E=Exhaust Valve)	Intake	Exhaust		Make and Model	Gap	Spark Occurs— No. Deg. or Pison Travel	No. of Flywheel Teeth or Timing Marks		Breaker Gap	Breaker Housing								
Bantam 60.....1938	4-2.2x3	.006	198	4½B	.006	A	A-A9	.025	TC	14B	3	7	90	1½	11	1½	1½-1½	0			
Bantam 60.....1939	4-2.2x3	.011	198	4½B	.011H	A	A-A9	.025	TC	14B	2	125	110	1½	11	1½	1½-1½	1½			
Bantam 65.....1940	4-2.26x3.12	.011	198	.....	.011H	A	Ch-H10	.025	4B	.....	3	5½	135	1½	15	1½	1½-1½	1½	
Bantam 65.....1941	4-2.26x3.12	.011	198	.....	.011H	A	Ch-H10	.025	4B	.....	3	5½	135	1½	15	1	1½-1½	1½	
Buick 38-40.....1936	8-3½x3½	††	8B	3½B	.015H	A	AC-H9	.025	2B	¾B	118†	2	114	3-3½	1½	1½-1½	31½-4½				
Buick 60, 80.....1936	8-3½x4½	††	14B	6B	.015H	A	AC-H9	.025	10B	4½B	17	108†	2½	1½-2½	1½	1½-1½	4½-5½				
Buick 36-90.....1936	8-3½x4½	††	14B	6B	.015H	A	AC-H9	.025	10B	4½B	15	108†	2½	1½-2½	1½	0-1½P	4½-5				
Buick 37-40.....1937	8-3½x4½	††	13B	5½B	.015H	A	AC-H9	.024	2B	¾B	15	120†	2	1½-2½	1½	1½-1½P	31½-4½				
Buick 60, 80, 90.....1937	8-3½x4½	††	14B	6B	.015H	A	AC-H9	.024	10B	4½B	15	119†	2½	1½-2½	1½	1½-1½P	31½-4½				
Buick 40.....1938-39	8-3½x4½	††	13B	5½B	.015H	A	AC-46	.025	4B	1½B	15	112	2	1-2½	1½	1½-1½P	F				
Buick 60, 80, 90.....1938-39	8-3½x4½	††	14B	6B	.015H	A	AC-46	.025	6B	2½B	15	114	2½	1½-2½	1½	1½-1½P	31½-4½				
Buick 40, 50.....1940	8-3½x4½	††	13B	5½B	.015H	A	AC-46	.025	4B	1½B	15	121†	2½	1½-2½	1½	0-1½P	31½-4½				
Buick 60, 70.....1940	8-3½x4½	††	14B	6B	.015H	A	AC-46	.025	6B	2½B	15	116	2½	1½-2½	1½	0-1½P	31½-4½				
Buick 80, 90.....1940	8-3½x4½	††	14B	6B	.015H	A	AC-46	.025	6B	2½B	15	116	2½	1½-2½	1½	0-1½P	4-5				
Buick 40, 50.....1941	8-3½x4½	††	13B	5½B	.015H	A	AC-104	.027	2B	.....	15	142	2	1½-2½	1½	1½-1½P	31½			
Buick 60, 70.....1941	8-3½x4½	††	14B	6B	.015H	A	AC-104	.027	6B	.....	15	151	2½	1½-2½	1½	1½-1½P	31½			
Buick 90.....1941	8-3½x4½	††	14B	6B	.015H	A	AC-104	.027	6B	.....	15	151	2½	1½-2½	1½	1½-1½P	31½			
Cadillac V16-90.....1936	16-3x4	.000	TC	TC	AA	AA	B	AC-G6	.026	4B	1½B	.016	Au	10	24	99	2½	1½	1	1½-1½	4
Cadillac V8-60.....1937	8-3½x4½	.....	000	TC	AA	AA	A	AC-K7	.027	5B	2½B	.015	Au	7	25	155†	2½	1½-1½	4½-5½	
Cadillac V8-65, 70, 75.....1937	8-3½x4½	.....	000	TC	AA	AA	A	AC-K7	.027	5B	2½B	.015	Au	7	25	170†	2½	0-1½	5½-6	
Cadillac V12-85.....1937	12-3½x4	.....	000	TC	AA	AA	B	AC-G7	.028	10B	3B	.021	Au	9	17	145†	2½	0-1½	5½-6	
Cadillac V16-80.....1937	16-3x4	.....	000	TC	AA	AA	B	AC-G6	.025	4B	1½B	.016	Au	10	24	154†	2½	0-1½	4½-5	
Cadillac V8-60, 60S.....1938	8-3½x4½	.....	000	TC	AA	AA	A	AC-45	.027	5B	2½B	.015	Au	7	25	155†	2½	0-1½	4½-5	
Cadillac V8-65.....1938	8-3½x4½	.....	000	TC	AA	AA	A	AC-45	.027	5B	2½B	.015	Au	7	25	155†	2½	0-1½	5½-6	
Cadillac V8-75.....1938	8-3½x4½	.....	000	TC	AA	AA	A	AC-45	.027	5B	2½B	.015	Au	7	25	155†	2½	0-1½	5½-6	
Cadillac V16-90.....1938	16-3½x3½	.....	000	AA	AA	A	A	AC-45	.027	5B	2½B	.015	Au	7	25	170†	2½	0-1½	5½-6	
Cadillac V8-61, 60S.....1939	8-3½x4½	.....	000	TC	AA	AA	A	AC-104	.027	5B	2½B	.015	Au	7	25	155†	2½	0-1½	5½-6	
Cadillac V8-75.....1939	8-3½x4½	.....	000	AA	AA	A	A	AC-104	.027	5B	2½B	.015	Au	7	25	170†	2½	0-1½	5½-6	
Cadillac V16-90.....1939	16-3½x3½	.....	000	AA	AA	A	A	AC-104	.032	6B	2½B	.015	A	11	30	180†	2	1½-2½	G	
Cadillac 40-60, 62-V8.....1940	8-3½x4½	.....	000	AA	AA	A	A	AC-104	.027	5B	2½B	.015	Au	7	24½	155†	2½	0-1½	5½-6	
Cadillac 40-72, 75-V8.....1940	8-3½x4½	.....	000	AA	AA	A	A	AC-104	.027	5B	2½B	.015	Au	7	24½	170†	2½	0-1½	5½-6	
Cadillac 40-90-V16.....1940	16-3½x4½	.....	000	AA	AA	A	A	AC-104	.032	6B	2½B	.015	Au	11	30	180†	2	1½-2½	5½-6	
Cadillac 61, 62, 63, 60S, 67, 75.....1941	8-3½x4½	.....	000	TC	AA	AA	A	AC-104	.027	5B	2½B	.015	Au	7	25	182	2½	1½-2½	5½-6	
Chevrolet FD-Master Conv. 1936	6-3½x4	.006	9B	3½B	.006H	.013H	A	AC-K11	.032	5B	1½B	.018	Au	5	15	112	2½	1½	1½-2½	7½-8	
Chevrolet FA, FC.....1936	6-3½x4	.006	9B	3½B	.006H	.013H	A	AC-K11	.032	5B	1½B	.018	Au	5	15	112	2½	1½	1½-2½	7½-8	
Chevrolet GA, GB.....1937	6-3½x4½	008	9B	3½B	.006H	.013H	A	AC-K11	.040	5B	2½B	.020	Au	5	14	112	2½	0-1½	4½-5	
Chevrolet HA, HB.....1938	6-3½x4½	008	9B	3½B	.006H	.013H	A	AC-46	.040	5B	2B	.021	Au	5	14	112	2½	0-1½	5-6	
Chevrolet Master 85.....1939	6-3½x4½	008	9B	3½B	.006H	.013H	A	AC-46	.040	5B	2B	.021	Au	5	14	112	2½	0-1½	5-6	
Chevrolet Master Deluxe.....1939	6-3½x4½	008	9B	3½B	.006H	.013H	A	AC-46	.040	5B	2B	.021	Au	5	14	112	2½	0-1½	5-6	
Chevrolet Master 85.....1940	6-3½x4½	008	9B	3½B	.006H	.013H	A	AC-44	.040	5B	2B	.021	Au	5	14	112	2½	0-1½	4½-5	
Chevrolet DL & MDL.....1940	6-3½x4½	008	9B	3½B	.006H	.013H	A	AC-44	.040	5B	2B	.021	Au	5	14	112	2½	0-1½	4½-5	
Chevrolet Master & Spec. 1941	6-3½x4½	008	9B	3½B	.006H	.013H	A	AC-104	.040	5B	2B	.018	Au	5	14	112	2½	0-1½	4½-5	
Chrysler C7-Airstream.....1936	6-3½x4½	.010	TC	VDM	.006H	.008H	A	Ch-J8	.025	TC	VDM	.020	Au	6	19	99	2½	1½	1½-2½	4½-5	
Chrysler C8-Del.Airstream.....1936	6-3½x4½	.011	2B	VDM	.006H	.008H	A	Ch-J8	.025	TC	VDM	.018	Au	6	22	103	2½	1½	1½-2½	5½-6	
Chrysler C9-Airflow.....1936	6-3½x4½	.011	2B	VDM	.006H	.008H	A	Ch-J8	.025	TC	VDM	.018	Au	6	17	103	2½	1½	1½-2½	5½-6	
Chrysler C10-Airflow Imp. 1936	6-3½x4½	.011	2B	VDM	.006H	.008H	A	Ch-H10	.025	5A	VDM	.018	Au	6	17	110	2½	1½	1½-2½	5½-6	
Chrysler C11-Arf. Cust. Imp. 1936	6-3½x4½	011	2B	VDM	.006H	.008H	A	Ch-H10	.025	5A	VDM	.018	Au	6	17	110	2½	1½	1½-2½	5½-6
Chrysler C16-Royal.....1937	6-3½x4½	014	TC	VDM	.006H	.010H	A	Ch-J8	.025	2A	VDM	.020	Au	5	15	112	2½	1½	1½-2½	4½-5
Chrysler C14-Imperial.....1937	8-3½x4½	011	2B	VDM	.006H	.010H	A	Ch-H10	.025	3A	VDM	.020	Au	5	15	112	2½	1½	1½-2½	4½-5
Chrysler C15-Custom Imp. 1937	8-3½x4½	011	2B	VDM	.006H	.010H	A	Ch-H10	.025	5A	VDM	.018	Au	6	17	110	2½	1½	1½-2½	4½-5
Chrysler C17-Airflow.....1937	8-3½x4½	011	2B	VDM	.006H	.010H	A	Ch-H10	.025	5A	VDM	.018	Au	6	17	110	2½	1½	1½-2½	4½-5
Chrysler C18-Royal.....1938	6-3½x4½	014	BB	VDM	.008H	.010H	A	Ch-J8	.025	TC	VDM	.020	Au	5	18	110	2½	1½	1½-2½	4½-5
Chrysler C19-Imperial.....1938	8-3½x4½	011	2B	VDM	.006H	.010H	A	Ch-J8	.025	3B	VDM	.018	Au	6	20	145†	2½	1½	1½-2½	4½-5
Chrysler C20-Cust. Imp. 1938	8-3½x4½	014	BB	VDM	.006H	.010H	A	Ch-H10	.025	2C	VDM	.020	Au	5	17	155†	2½	1½	1½-2½	4½-5
Chrysler C22-Royal.....1939	6-3½x4½	014	BB	VDM	.008H	.010H	A	A-A7	.025	TC	VDM	.018	Au	6	24	155†	2½	1½	1½-2½	4½-5
Chrysler C24-Cust. Imp. 1939	8-3½x4½	011	BB	VDM	.008H	.010H	A	A-A7	.025	3B	VDM	.018	Au	6	24	155†	2½	1½	1½-2½	4½-5
Chry. Winds. & Royal C25.....1940	6-3½x4½	.....	014	12B	VDM	.008H	.010H	A	AL-AT7B	.025	TC	VDM	.02							

Tune Up Specifications—(1936 to 1941 Inclusive)—Continued

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES						Rods Removed from	IGNITION						CRANK- PIN	FRONT AXLE			Kingpin Inclination (Degrees)			
		Inlet Tappet Clearance for Valve Timing		Intake Valve Opens Before or After T. C.		Operating Tappet Clearance			Timing				Capacity Crank Case (Qts.)		Compression Pressure at Cranking Speed (Lbs.) (Standard Head)		Caster (Degrees)	Camber (Degrees)	Toe-in (Inches)			
		No. of Degrees (E = Exhaust Valve)	No. of Flywheel Teeth (E = Exhaust Valve)	No. of Flywheel Teeth (E = Exhaust Valve)	Intake	Exhaust	Intake		Make and Model	Gap	Spark Occurs— No. Deg. or Piston Travel	No. of Flywheel Teeth or Timing Marks	Breaker Gap	Breaker Housing	Length	Diameter						
Graham—Con'td.																						
Graham 90A-Cavalier	1936	6-3½x4	.012	2A	¾A	.012H	.012H	A	Ch-C7	.025 TC	TC	.018 Au	15	114	1½	4-4½	1	½	7½	Pac		
Graham 110-Sup. Ch.	1936	6-3½x4½	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025 TC	TC	.018 Au	15	114	2½	4½-5½	1	½	7½	Pac		
Graham 85	1937	6-3x4	.012	4½B	1½B	.010H	.010H	A	Ch-7	.025 2B	¾B	.018 Au	11	115	1½	4-4½	1	½	7½	Pac		
Graham 95	1937	6-3½x4	.012	2A	¾A	.010H	.010H	A	Ch-J9	.025 TC	TC	.018 Au	5	114	1½	3-4	1	½	7½	Pac		
Graham 116-Super Ch.	1937	6-3½x4	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025 4A	1½A	.018 Au	5	114	2½	3-4	1	½	7½	Pac		
Graham 120-Super Ch.	1937	6-3½x4½	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025 4A	1½B	.018 Au	5	15	1½	3-4	1	½	7½	Pac		
Graham 96-Stand. & Spec.	1938	6-3½x4½	.012	4½B	1½B	.010H	.010H	A	Ch-J9	.025 4B	1½B	.018 Au	5	15	150†	120	2½	3-4	1	½	7½	Pac
Graham 97-SC. & Cust. SC.	1939	6-3½x4½	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025 TC	TC	.018 Au	14	120	2½	3-4	1	½	7½	Pac		
Graham 97-SC. & Cust. SC.	1939	6-3½x4½	.012	4½B	1½B	.010H	.010H	A	Ch-H10	.025 4½A	1½A	.018 Au	5	15	130	120	2½	3-4	1	½	7½	Pac
Graham DeL. & Cust.	1940	6-3½x4½	.010	8½B	1½B	.010H	.010H	A	Ch-J10	.025 TC	TC	.018 Au	5	14	125	2½	3-4	1	½	7½	Pac	
Graham SC. & Cust. SC.	1940	6-3½x4½	.010	8½B	1½B	.010H	.010H	A	Ch-J10	.025 4½B	...	.018 Au	5	15	130	2½	3-4	1	½	7½	Pac
Hudson 63	1936	6-3x5	.010	10½B	4B	.006H	.008H	A	Ch-J8	.025 TC	TC	.020 Au	6	13	103	1½	31½-41½	1-1½	0-½	7	Pac	
Hudson 64-5-6-7	1936	6-3½x4½	.010	10½B	4B	.006H	.008H	B	Ch-J8	.025 TC	TC	.020 Au	7	20	104	1½	31½-41½	1-1½	0-½	7	Pac	
Hudson 73	1937	8-3x4½	.008	10½B	4B	.008H	.010H	A	Ch-J8	.025 TC	TC	.020 Au	5	20	80	1½	0-½	1-1½	0-½	7	Pac	
Hudson 74-5-6-7	1937	8-3x4½	.008	10½B	4B	.008H	.010H	B	Ch-J8	.025 TC	TC	.020 Au	7	20	80	1½	0-½	1-1½	0-½	7	Pac	
Hudson 89 (112)	1938	6-3½x4½	.006	10½B	4B	.006H	.008H	A	Ch-J8A	.032 TC	TC	.020 Au	6	12½	115	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson 83	1938	6-3x5	.006	10½B	4B	.006H	.008H	A	Ch-J8A	.032 TC	TC	.017 Au	9	17½	118	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson 84-5-7	1938	8-3x4½	.006	10½B	4B	.006H	.008H	A	Ch-J8A	.032 TC	TC	.020 Au	6	12½	120	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson 90-98 (112)	1939	6-3x4½	...	10½B	4B	.006H	.008H	A	Ch-J8A	.032 TC	TC	.017 Au	9	12½	115	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson 92-93	1939	6-3x5	...	10½B	4B	.006H	.008H	A	Ch-J8A	.032 TC	TC	.020 Au	6	12½	120	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson 95-97	1939	8-3x4½	...	10½B	4B	.006H	.008H	A	Ch-J8A	.032 TC	TC	.017 Au	9	17½	121	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson Six & Del.	1940	6-3x4½	...	10½B	4B	.006H	.008H	A	Ch-J8A	.032 TC	TC	.020 Au	6	13	125	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson Super & CC 6	1940	6-3x5	...	10½B	4B	.006H	.008H	A	Ch-J8A	.032 TC	TC	.020 Au	6	13	120	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson Eight & CC 8	1940	6-3x4½	...	10½B	4B	.006H	.008H	A	Ch-J8A	.032 TC	TC	.017 Au	9	18	119	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson Series 10	1941	6-3x4½	...	10½B	4B	.006H	.008H	A	Ch-J9	.038 TC	TC	.020 Au	6	13	125	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson Series 11, 12	1941	6-3x5	...	10½B	4B	.006H	.008H	A	Ch-J9	.038 TC	TC	.020 Au	6	13	120	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson Series 14	1941	8-3x4½	...	10½B	4B	.006H	.008H	A	Ch-J9	.038 TC	TC	.017 Au	9	18	119	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson Series 17	1941	8-3x4½	...	10½B	4B	.006H	.008H	A	Ch-J9	.038 TC	TC	.017 Au	9	18	119	1½	13½-2-3	1-1½	0-½	7	Pac	
Hudson-Terraplane 81-82	1938	6-3x5	...	10½B	4B	.006	.008	A	Ch-J8A	.032 TC	TC	.020 Au	4½	12½	120	1½	13½-2-3	1-1½	0-½	7	Pac	
La Fayette 3610	1936	6-3½x4½	.015	5A	1½A	.015H	.015H	A	AC-G8	.023 10B	3B	.020 Au	7	19	90	2	1½	2½	1½	7	Pac	
La Salle V8 37-50	1937	8-3½x4½	.000	TC	TC	.000	.000	A	AC-K7	.026 5B	2½B	.015 Au	7	25	105	2½	2½-1	1½-1	½-½	4½-5½	Pac	
La Salle V8 38-50	1938	8-3½x4½	.000	AA	TC	.027 5B	2½B	A	AC-45	.015 Au	7	25	155†	2½	2½-0	1½-0	½-½	4½-5½	Pac			
La Salle V8 39-50	1939	8-3½x4½	.000	AA	TC	.027 5B	2½B	A	AC-104	.015 Au	7	25	155†	2½	2½-2N-2N	0-¾	½-½	5½-6	Pac			
La Salle 40-50, 52	1940	8-3½x4½	.000	AA	TC	.027 5B	2½B	A	AC-104	.015 Au	7	25	155†	2½	2½-2N-2N	0-¾	½-½	5½-6	Pac			
Lincoln 321, 322	1936	12-3½x4½	.004	21B	6½B	.004C	.006C	B	Ch-7	.025 TC	TC	.020 Au	12	32	108	2½	2	1½	1½	7½	Pac	
Lincoln 351	1937	12-3½x4½	.004	AA	CSM	.025 TC	TC	B	Ch-7	.025 TC	TC	.020 Au	12	32	108	2½	2	8	1½	7½	Pac	
Lincoln 401 to 425	1938-39-40	12-3½x4½	.004	21B	6½B	.025 TC	TC	B	Ch-7	.029 7B	2½B	.020 Au	12	32	105	2½	2	1½	1½	7½	Pac	
Lincoln Zephyr 900	1936	12-2½x3½	.013	19½B	6B	.013C	.013C	A	Ch-J9	.025 4B	1½B	.015 Au	6	27	105	2½	1.75	4½-9	1-1½	8-8½	Pac	
Lincoln Zephyr HB	1937	12-2½x3½	.013	19½B	6B	.013C	.013C	A	Ch-J9	.029 4B	1½B	.015 Au	6	27	105	2½	1.75	4½-9	1-1½	8-8½	Pac	
Lincoln Zephyr 700, 96H 1938-39	1940	12-2½x3½	.013	19½B	6B	.013C	.013C	A	Ch-H10	.029 4B	1½B	.015 Au	5	30	105	2½	1.75	4½-9	1-1½	8-8½	Pac	
Lincoln V12	1940	12-2½x3½	.013	21B	6½B	.013C	.013C	A	Ch-H10	.029 4B	1½B	.015 Au	5	27	105	2½	1.57	4	½	7	Pac	
Lincoln Zephyr & Cont.	1941	12-2.87x3.75	.013	HA	10½B	.013C	.013C	A	Ch-H10	.029 4B	1½B	.015 Au	5	27	105	2½	1.75	3-5	1-1½	3½-4½	Pac	
Lincoln Custom	1941	12-2.87x3.75	.013	HA	10½B	.013C	.013C	A	Ch-H10	.029 4B	1½B	.015 Au	5	27	105	2½	1.75	3-5	1-1½	3½-4½	Pac	
Mercury 99A	1939	8-3½x3½	.013	TC	TC	.013C	.013C	A	Ch-H10	.025 4B	1½B	.015 Au	5	21	100	2½	1.75	4½-9	1-1½	8	Sh	
Mercury U8	1940	8-3.18x3½	.013	TC	TC	.013C	.013C	A	Ch-H10	.025 4B	1½B	.015 Au	5	21	145*	2½	1.75	4½-9	1-1½	8	Sh	
Mercury	1941	8-3.18x3½	.012	TC	TC	.012C	.012C	A	Ch-H10	.025 4B	1½B	.015 Au	5	23½	145	2½	1.75	4½-9	1-1½	8	Sh	
Nash 3640A-400 Del. 6	1936	6-3½x4½	.015	CSM	CSM	.015H	.015H	A	AC-G8	.025 VDM	VDM	.020 Au	18	83	2	1½	2½	0-1½	½	7	St	
Nash 3620-Amb. Twn. Ign. 6	1936	6-3½x4½	.015	CSM	CSM	.015H	.015H	A	AC-K7	.025 VDM	VDM	.020 Au	7	17½	93	2	1½	2½	0-1½	½	7	St
Nash 3680-Amb. Twn. Ign. 8	1936	8-3½x4½	.015	CSM	CSM	.015H	.015H	A	AC-K12	.025 VDM	VDM	.018 Au	7	21	81	2	1½	2½	0-1½	½	7	St
Nash 3720-Ambassador 6	1937	8-3½x4½	.008	20B	CSM	.008H	.015H	B	AC-45	.027 4B	VDM	.022 Au	7	17	93	2	1½	2½	0-1½	½	7	St
Nash 3780-Ambassador 8	1937	8-3½x4½	.008	20B	CSM	.008H	.015H	B	AC-45	.027 4B	VDM	.022 Re	7	20	125	2	1.24	1½	0	7	St	
Nash 3820-Amb. 6	1938	6-3½x4½	.008	20B	CSM</																	

Tune Up Specifications—(1936 to 1941 Inclusive)—Continued

MAKE AND MODEL	No. of Cylinders and Bore and Stroke	VALVES				IGNITION				FRONT AXLE												
		Inlet Tappet Clearance for Valve Timing		Intake Valve Opens Before or After T. C. (E = Exhaust Valve)		Operating Tappet Clearance		Spark Plug		Timing		Capacity Crank Case (Qts.)		Caster (Degrees)		Camber (Degrees)		Toe-in (Inches)		Kingpin Inclination (Degrees)		
		No. of Flywheel Teeth (E = Exhaust Valve)	No. of Flywheel Teeth (E = Exhaust Valve)	Intake	Exhaust	Rods Removed from	Make and Model	Gap	Spark Occurs— No. Deg. or Piston Travel	No. of Flywheel Teeth or Timing Marks	Breaker Gap	Breaker Housing	Diameter	Length	Capacity Cooling System (Qts.)	Compression Pressure at Cranking Speed (Lbs./Square Inch) (Standard Head)	Crank-Pin	Front Axle				
Packard 120B.....1936	8-3½x4½	.006	7B	2½B	.007H	.010H	A	CA-J8-K7	.029	7B	2½B	.020	Au	7	18	110	2½	1½	2	1	1½-6	1½
Packard 1400, 1, 2.....1936	8-3½x5	.004	30B	10B	.004H	.006H	(r)	CA-J8-K7	.029	6B	2B	.020	Au	8	20	110	2½	1½	1	1	0-1	0
Packard 1403, 4, 5-Super 8.....1936	8-3½x5	.004	30B	10B	.004H	.006H	A	CA-J8-K7	.029	6B	2B	.020	Au	9½	22	110	2½	1½	1	1	0-1	0
Packard 1407, 8-V12.....1936	12-3½x4½	.000	TC	TC	AA	AA	(r)	CA-J8-K7	.029	8B	2½B	.020	Au	10	18	110	2½	2½	1	1	0-1	0
Packard 115C.....1937	6-3½x4½	.000	5B	2B	.007H	.010H	A	AC-Y4°	.028	4B	11-4B	.015	Au	7	17	105	2½	1½	2½-1½	1	1½-6	1½
Packard 120C.....1937	6-3½x4½	.000	5B	2B	.007H	.010H	A	AC-Y4°	.028	6B	2½B	.015	Au	7	20	110	2½	1½	2½-1½	1	1½-6	1½
Packard 1500, 1, 2-Super 8.....1937	8-3½x5	.000	30B	12-½B	.004H	.006H	(r)	AC-Y4°	.028	6B	2½B	.015	Au	8	24	108	2½	2½	1	1	0-1	0
Packard 1506, 7, 8-V12.....1937	12-3½x4½	.000	TC	TC	AA	AA	(r)	AC-Y4°	.028	6B	2B	.020	Au	10	40	108	2½	2½	1	1	0-1	0
Packard 1600.....1938	6-3½x4½	.000	1B	½B	.007H	.010H	A	Ch-Y4°	.028	6B	2½B	.020	Au	6	15	110	2½	1½	2½-1½	1	1½-6	1½
Packard 1601, 2.....1938	6-3½x4½	.000	1B	½B	.007H	.010H	A	Ch-Y4°	.028	6B	2½B	.015	Au	6	16	110	2½	1½	2½-1½	1	1½-6	1½
Packard 1603, 4, 5-Super 8.....1938	8-3½x5	.000	30B	12-½B	.006H	.008H	(r)	Ch-Y4°	.028	6B	2½B	.015	Au	8	20	110	2½	1½	2½-1½	1	1½-6	1½
Packard 1807, 8; 1706, 7, 8; 1938-39	12-3½x4½	.000	TC	TC	AA	AA	(r)	Ch-Y4°	.028	6B	2B	.020	Au	10	40	110	2½	1½	2½-1½	1	1½-6	1½
Packard 1807, 8; 1706, 7, 8; 1938-39	12-3½x4½	.0125	1B	½B	.007H	.010H	A	Ch-Y4°	.028	6B	2½B	.020	Au	5	15	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1701, 2.....1939	8-3½x4½	.0125	1B	½B	.007H	.010H	A	Ch-Y4°	.028	6B	3B	.015	Au	6	16	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1703, 5.....1939	8-3½x5	.005	26B	10½B	.006H	.008H	A	Ch-Y4°	.028	6B	3B	.015	Au	7½	22	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1800, 6.....1940	6-3½x4½	.012	1B	½B	.007H	.010H	A	AC-1042	.028	6B	3B	.020	Au	5	17	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1801, 8.....1940	8-3½x4½	.012	1B	½B	.007H	.010H	A	AC-1042	.028	6B	3B	.015	Au	6	18	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1803, 4, 5; Sup. 8.....1940	8-3½x4½	.011	6A	AA	AA	AA	AA	AC-1042	.028	5B	3B	.015	Au	7	20	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1806, 7, 8; Cus. Sup. 8.....1940	8-3½x4½	.011	6A	AA	AA	AA	AA	AC-1042	.028	5B	3B	.020	Au	5	15	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1900.....1941	6-3½x4½	.012	1B	½B	.007H	.010H	A	AC	.028	6B	3B	.017	Au	6	17	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1901.....1941	8-3½x4½	.012	1B	½B	.007H	.010H	A	AC	.028	6B	3B	.017	Au	7	20	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1903-04-05.....1941	8-3½x4½	.012	HA	4B	HA	HA	HA	AC	.028	5B	3B	.017	Au	7	20	2	2½	1½	2½-1½	0	1½-6	1½
Packard 1906-07-08.....1941	8-3½x4½	.012	HA	4B	HA	HA	HA	AC	.028	5B	3B	.017	Au	7	20	2	2½	1½	2½-1½	0	1½-6	1½
Plymouth P1, P2.....1936	6-3½x4½	.011	6A	VDM	.006H	.008H	A	AC-K9	.025	4A	VDM	.020	Au	5	15	114	1½	1	1-3	1½-6	0-16	0-16
Plymouth P3, P4.....1937	6-3½x4½	.011	6A	VDM	.006H	.008H	A	Ch-J8	.025	4A	VDM	.020	Au	5	15	114	1½	1	1-3	1½-6	0-16	4½-8½
Plymouth P5.....1938	6-3½x4½	.011	6A	VDM	.006H	.008H	A	Ch-J8	.025	4A	VDM	.020	Au	5	14	145	1½	1	3-5	1½-6	0-16	4½-8½
Plymouth P6.....1938	6-3½x4½	.011	6A	VDM	.006H	.008H	A	A-A7	.025	4A	VDM	.020	Au	5	14	145	1½	1	3-5	1½-6	0-16	5½-9½
Plymouth P7.....1939	6-3½x4½	.011	6A	VDM	.006H	.008H	A	Ch-J8	.025	TC	VDM	.020	Au	5	14	145	1½	1	3-5	1½-6	0-16	5½-9½
Plymouth P8.....1939	6-3½x4½	.011	6A	VDM	.006H	.008H	A	A-A7	.025	TC	VDM	.020	Au	5	14	145	1½	1	3-5	1½-6	0-16	5½-9½
Plymouth P9 Roadking.....1940	6-3½x4½	.011	6A	AA	AA	AA	AA	AL-AT7	.025	TC	TC	.020	Au	5	14	150	1½	1	N1-1	0-16	0-16	4½-8½
Plymouth P10 DeLuxe.....1940	6-3½x4½	.011	6A	AA	AA	AA	AA	AL-AT7	.025	TC	TC	.020	Au	5	14	150	1½	1	N1-1	0-16	0-16	4½-8½
Plymouth P11.....1941	6-3½x4½	.014	9B	AA	.008H	.010H	A	AL-AT7	.025	TC	TC	.020	Au	5	14	150	1½	1	IN-1P	0-3½P	0-16	4½-8½
Plymouth Special Deluxe.....1941	6-3½x4½	.014	9B	AA	.008H	.010H	A	AL-AT7	.025	TC	TC	.020	Au	5	14	150	1½	1	IN-1P	0-3½P	0-16	4½-8½
Pontiac 36-26BB-Master 6.....1936	6-3½x4½	.010	5B	2B	.010H	.010H	A	AC-K7	.025	4B	FM	.020	Au	6	15	103	2	1½	0-1½	1½-1½	0-16	7½
Pontiac 36-26BA-DeLuxe 6.....1936	6-3½x4½	.010	5B	2B	.010H	.010H	A	AC-K7	.025	4B	FM	.020	Au	6	15	103	2	1½	0	1-3	0-16	8½
Pontiac 36-28BA-Eight.....1936	8-3½x4½	.010	5B	2B	.010H	.010H	A	AC-K7	.025	4B	FM	.018	Au	7	18½	103	2	1½	0	1-3	0-16	8½
Pontiac 37-26CA.....1937	6-3½x4½	.015	5B	2B	.012H	.012H	A	AC-K7	.025	4B	FM	.019	Au	6	15	103	2	1½	2N-1½P	4N-1½P	0-16	5½-9½
Pontiac 37-28CA.....1937	8-3½x4½	.015	5B	2B	.012H	.012H	A	AC-K7	.025	4B	FM	.016	Au	7	19	103	2	1½	2N-1½P	4N-1½P	0-16	5½-9½
Pontiac 38-26DA.....1938-39	8-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.015	Au	7	19	141	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 38-28DA, 39-28.....1938-39	8-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.015	Au	7	19	141	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 39-25.....1939	6-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.021	Au	6	17	141	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 40-25, 26.....1940	6-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.021	Au	6	17	156	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 40-28, 29.....1940	8-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.015	Au	6	19	152	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 41-25.....1941	6-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.021	Au	6	18	152	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 41-25.....1941	6-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.021	Au	6	18	152	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 41-24.....1941	6-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.021	Au	6	18	152	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 41-24.....1941	8-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.015	Au	6	19½	152	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 41-27.....1941	8-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.015	Au	6	19½	152	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 41-28.....1941	8-3½x4½	.015	5B	2B	.012H	.012H	A	AC-45	.025	4B	FM	.015	Au	6	19½	152	2	1½	2N-1½P	4N-1½P	0-16	4½-8½
Pontiac 41-29.....																						



NEWS

Detroit News Letter

By Ed Warner

Substitution of other materials for those in which a shortage exists due to the demands of the national defense program has been readily achieved by technicians of the Ford Motor Co. After an intensive study of the 15,000 parts in the Ford V-8, changes already made will result in an 80 per cent saving in nickel, a 50 per cent saving in aluminum, and 50 per cent saving in zinc by the company. In zinc alone, a saving of 6000 tons per year will be made by replacing metal die cast trimmings with steel stampings.

The aluminum shortage did not affect Ford as far as pistons were concerned, although many manufacturers, notably Chrysler, may have to shift to the cast-iron or steel type. Ford began the use of steel cast pistons of the same weight as aluminum in 1935, and since then has produced more than 31,000,000 steel pistons.

Among the substitutes worked out by Ford engineers have been straight chromium steel instead of nickel-chromium steel on all-bright metal trim, or other ferrous material for eight out of 10 tractor parts now made of

aluminum, steel and bakelite timing gear in place of aluminum, cast-iron cylinder head instead of an aluminum head (the former also proving more efficient), and cast iron in place of aluminum distributor body. Other substitutions have been a plastic instrument panel instead of a die-cast grille which required 2½ lb. of zinc per car, interior metal trim replaced by plastic or bright finished steel, complete elimination on parts made of magnesium, and a copper radiator shell instead of brass, which required 35 to 40 per cent zinc. Ford technicians now are working on substitute materials for tin, tungsten and cork, in which future shortages may occur.

Production of 1941 models passed the three million mark during March, which saw an output of approximately 517,000 cars and trucks. Chevrolet already has produced 800,000 1941 models, while the same total in 1940 model output was not reached until mid-May. Buick is nearing the 250,000 mark in 1941 model production, while Dodge has turned out more than 116,000 passenger cars with fluid drive up to mid-March, ex-



BATTLE STYLE. A woman member of the British mechanized Transport Corps cranks her car, dressed in the new-style uniform, which members of the corps find more comfortable than more feminine styles.



ODD BUT TRUE. The motorist passing through Lynchville, Me., might be tempted to dispute the distances to the places named on this unique sign, but they are true. They are all towns in Maine.



TITLE ON ICE. "Ice buggies" line up before the start of the New England championship over a half-mile course on Alton Bay, N. H. Charlie Junkala, of Keene, slithered his way over 20 laps of the slippery course to win with an average speed of 52 miles an hour.

clusive of those without this feature and of trucks.

February retail sales were the largest for a single month since June, 1937, despite the fact that February had only 28 days. The February sales total was 420,221 units, according to the AMA, a 48 per cent gain over the previous February. Commercial vehicles sales of 74,670 units during February were the biggest for any month in the last 10 years.

Stewart-Warner Report

Stewart-Warner Corp. and subsidiaries reported a net profit for 1940



MECHANICAL MIGHT. More than 2,000 motor vehicles, including tanks, trucks and scout cars, drawn up for recent review at Fort Benning, Ga. The equipment belongs to the Second Armored Division of the Army, which is modernizing its rapidly expanding forces as rapidly as the needed mechanical equipment

can be produced. In the review at Fort Benning, 10,000 men participated, demonstrating the growing strength of the American armed forces as well as the increased power and mobility gained by a present-day army through the use of motorized equipment.



HAND CONTROL. A police constable at Rottingdean, near Brighton, England, wearing gloves with the word "stop" on either side. Since the warning was easily visible, motorists welcomed the idea, as it kept them from mistaking the arm movements of the constable.



MECHANETTES. Girls from Barnard College, New York, start training as automobile mechanics in case Army requirements bring a shortage of male skill. Antoinette de B. Loezere, left, and Frances Hussey, right, remove cylinder-head bolts, while G. Philip Lawrence removes knee-action bolts.

of \$1,470,804, equal to earnings per share of \$1.18, the annual report, mailed to stockholders last month, revealed. This compares with net profit of \$553,224, and 45 cents per share, for 1939.

The net profit for 1940, out of which two dividends of 25 cents each were paid, is an increase of 166 per cent over 1939, when one dividend of 25 cents was paid.

Sales for 1940 totaled \$29,272,500 against \$25,825,829 a year ago, an increase of 13 per cent.

Income taxes for 1940 increased 564 per cent over 1939: \$828,037 and \$124,715, respectively.

Le Begue May Drive Again at Indianapolis

Rene Le Begue, French speed ace who finished in the money during his first shot at top honors in the Indianapolis 500-mile race last year, is hankering for another try.

The sprightly, daredevil Frenchman who turned in a flashy qualifying heat of 118 miles an hour during the time trials preceding the contest, is convinced he has what it takes to maintain that average over the long grind, and so to best the 500-mile record average of 117.2 miles, set by the late Floyd Roberts in 1938.

From Vichy, France, Le Begue writes Speedway officials that he has arranged backing to bring over two French cars that he figures will lend wings to his ambition and place him and a racing confrade yet to be selected well out in front at the fall of the checkered flag during the coming annual Decoration Day event.

For his first Speedway appearance, in the 500-mile classic of last year, Le Begue and his teammate, Rene Dreyfus, were demobilized from the French army. Their cars were Italian Maseratis, with Luigi Chinetti, an Italian national, as technician and relief driver.



MIDGET CLIMBER. One of the new midget scout cars, recently ordered by the Army in large numbers, climbs the steps of the Capitol at Washington. Driving is Sen. James M. Mead, New York, with Rep. J. Parnell Thomas, New Jersey, as passenger.

AERIAL RACE. Bob Packard, in the midget racer at extreme right, takes to the air for part of the race at Ascot Speedway, California. Bud Sennett in white car, skidded. Ed Davis, in No. 24, skidded safely around him, but Packard crashed into him, and bounced into air. Packard was unhurt.

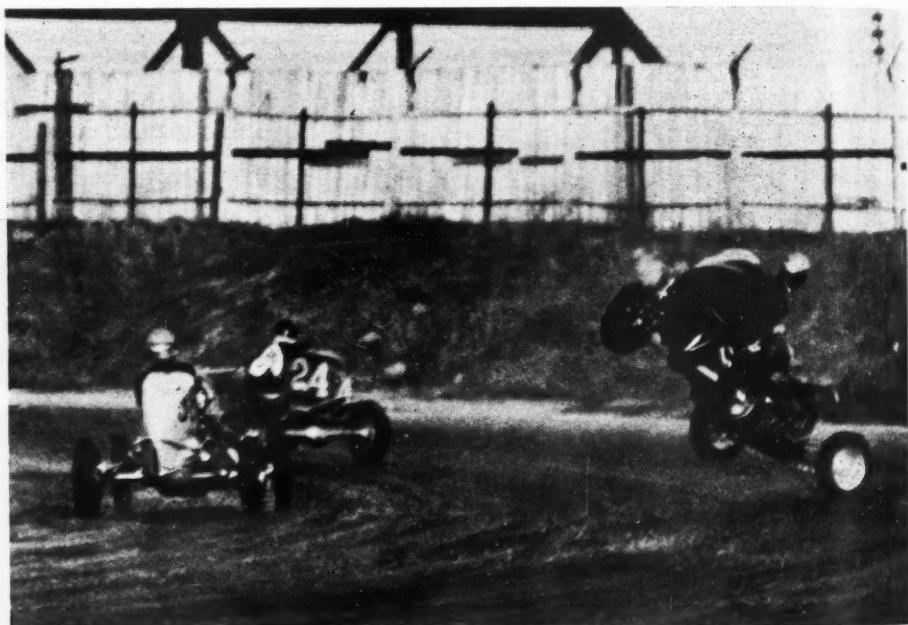
MEWA 'Liberty' Drive Ready for Jobbers

The Motor and Equipment Wholesalers Association's promotional campaign, which was approved by the members of the association at their annual convention in December, is now all set to go into the hands of the jobbers, and was scheduled to appear throughout the retail automotive trade about April 1.

This program for 1941, which will consist of a total of nine folders, one for each month from April 1, to Dec. 1, will be distributed by M.E.W.A. members to their customers. The theme of this program is designed to protect the freedom and independence of automotive retailers and chief target of this activity will be the dic-

tator-like methods used by some interests in an attempt to force retailers to buy merchandise of various kinds from designated sources.

Attractively printed in a red, white and blue color scheme and in a compact size that will fit into all mailings sent out by the jobber, the first three folders in the series will be on the following subjects: Number One will be titled "Who Gives Credit to Who." The second will deal on the subject of "Genuine Parts," and the third promotional piece will deal with the way the jobber's customer may add improvements to his business by using the extended payment plan the jobber has to offer to his customers.



New Passenger Car Registrations*

	January 1941	December 1940	January 1940	Per Cent Change January 1941 Over 1940	Per Cent of Total January		Four Months Model Year		
					1941	1940	1941	1940	Per Cent Change
Chevrolet	71,151	88,195	65,945	+ 8.0	23.78	25.34	303,046	215,530	+ 41.0
Ford	52,088	52,810	42,824	+ 21.6	17.41	16.46	195,071	168,614	+ 15.8
Plymouth	35,219	37,621	32,987	+ 6.8	11.77	12.68	151,809	99,200	+ 53.0
Buick	26,273	28,758	23,108	+ 3.5	8.78	8.88	115,265	98,078	+ 17.7
Pontiac	22,346	25,143	16,203	+ 37.7	7.47	6.23	93,882	60,632	+ 41.0
Oldsmobile	19,247	21,740	14,141	+ 36.5	6.43	5.43	79,501	60,906	+ 30.4
Dodge	16,661	17,584	16,514	+ 1.0	5.57	6.35	60,303	43,633	+ 38.0
Chrysler	10,801	11,421	7,374	+ 46.6	3.61	2.83	38,401	19,435	+ 98.0
Studebaker	7,991	8,747	7,147	+ 12.0	2.68	2.75	34,908	32,886	+ 6.1
Mercury	7,061	7,840	6,734	+ 5.0	2.36	2.59	26,656	25,184	+ 6.0
De Soto	6,132	6,997	5,137	+ 19.4	2.05	1.97	24,051	14,797	+ 62.1
Nash	5,607	6,164	4,335	+ 29.3	1.88	1.67	18,732	18,239	+ 3.0
Hudson	5,423	6,227	5,737	- 5.4	1.81	2.20	25,752	30,319	- 15.0
Cadillac	5,145	5,360	2,885	+ 78.0	1.72	1.11	19,024	13,334	+ 42.5
Packard	4,496	5,678	5,271	- 14.7	1.50	2.03	23,033	28,384	- 18.8
Lincoln	1,639	1,817	2,008	- 18.2	.55	.77	7,102	7,305	- 2.8
Willys-Amerimar	1,488	1,645	1,678	- 9.5	.50	.64	6,334	7,466	- 15.2
Graham	133	150	36	+ 270.0	.04	.01	664	286	+ 132.0
Crosley	42	32	51	- 17.7	.01	.02	153	209	- 26.7
Bantam	28	26	78	- 67.9	.01	.03	124	330	- 62.4
Hupmobile	9	32	8	+ 12.5	.07	.01	127	48	+ 165.0
Miscellaneous	202	86	15				1,230	102	+ 815.0
Total	299,179	334,073	260,216	+ 15.0	100.00	100.00	1,225,177	950,917	+ 28.6
Chrysler Corporation	68,813	73,623	62,012	+ 11.0	23.00	23.83	274,573	177,065	+ 55.0
Ford Motors	60,788	62,467	51,566	+ 18.0	20.32	19.82	228,829	201,103	+ 14.0
General Motors Corp.	144,162	169,196	122,282	+ 17.9	48.18	46.99	610,718	454,480	+ 34.5
All Others	25,416	28,787	24,356	+ 4.3	8.50	9.36	111,057	118,269	- 6.1

* Includes Federal Government deliveries.

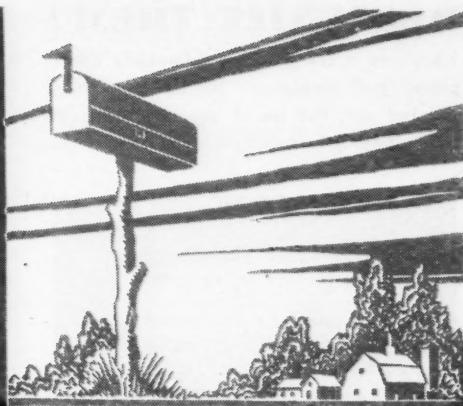
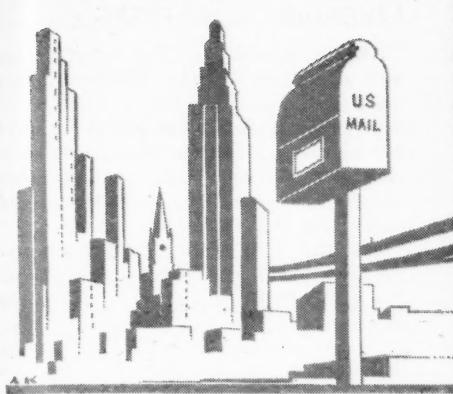
Willys Sales Campaign

Willys dealers operating in metropolitan areas throughout the country are engaged in a new sales campaign based on a trade-in allowance of \$175 for any used car in operating condition when traded in on a new Willys Americar.

This plan is already in operation in San Francisco, Seattle, Minneapolis, Baltimore and other areas, and is responsible for a greatly increased volume of new car sales, according to J. W. Frazer, president of Willys-Overland Motors, Inc., Toledo, Ohio. Speaking at a meeting of Philadelphia dealers last month, Frazer explained the operation of the new sales plan and received the endorsement of the dealers to put it in operation in that area early in April.

New car production will not be seriously hampered by national defense contracts in which Willys-Overland is engaged, Frazer stated. The company has government contracts for approximately 20 million dollars worth

(Continued on page 130)



Bill Toboldt, Editor, Motor Age

THE READERS'

CLEARING HOUSE of Servicemen's Queries

ROD BEARING KNOCK

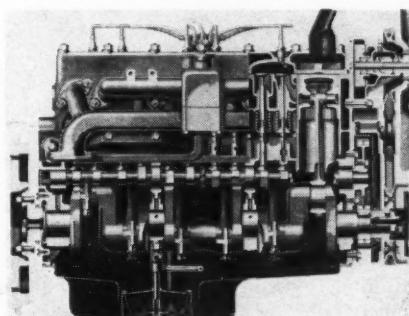
We have a 1934 Plymouth, 51,000 miles, .010 in. undersize crank shaft. New rod bearings, new rings, pistons expanded, installed camshaft, oil leaks checked, checked main bearings for looseness and for being warped, and checked timing chain. Oil pressure 45 lb. at idling speed and 75 lb. at 40 m.p.h.

The car idles perfectly but at 40 m.p.h. it has a very loud knock or clatter, which disappears on a hard pull. Will short cut on number one and is not so loud when the breather cap is removed.—Walter Fulk, Newark, Ohio.

I AM inclined to believe that you will find this knock to be caused by a loose connecting rod bearing, even though you have already installed new bearings. I feel sure you will find that one of these bearings does not fit properly on the shaft.

My suggestion is that you check the fit of all the connecting rod bearings, particularly number one since that seems to be the one at which

the knock occurs, by using a piece of .002 in. thickness gage, 1 in. long, laid in the rod bearing cap and the cap bolted up tight to the upper half of the rod. As you turn the engine over by hand, I believe you will find that there is a slight drag on part of the throw and that the drag disappears entirely on another part of the throw indicating that the shaft bearing journal is out of round. If this is the case, the journal will have to be turned true and an under-sized bearing fitted before you will be able to overcome this noise.



DOUBLE TROUBLE

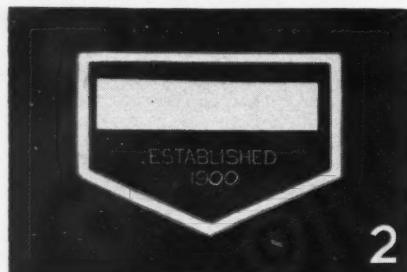
My first problem is a 1937 Century Buick. This car has an overflow pipe and check valve which allows excess gasoline to flow to the ground from the intake manifold. I am not able to get the ball check to shut off when the motor starts unless I tap the ball check assembly with a wrench or something. I have 19 in. of vacuum and I have tried three different check valves. What do you suggest?

My next one is a 1940 Nash Six, Model 4010 which I have thoroughly tuned on analyzer, also ground valves. Road performance at all speeds is excellent, but I cannot get a good idle and only have 16 in. of vacuum. Valves were adjusted hot while running at .015 in. Everything checks O.K. except low vacuum. Combination fuel pump is not the trouble.—S. E. Sheffer, Baltimore, Md.

I HAVE heard of this complaint regarding the check valve in the manifold drain tube before, and in the majority of cases it can be eliminated by turning the elbow so that it is on

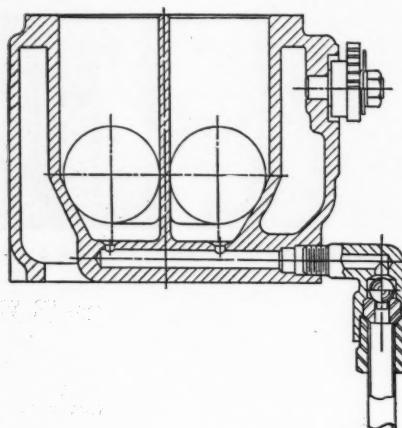
RECOGNIZE THEM?

Here are a few famous automobile nameplates and emblems. Names have been blanked out, but see if you can recognize them. Identification will be found on page 86.



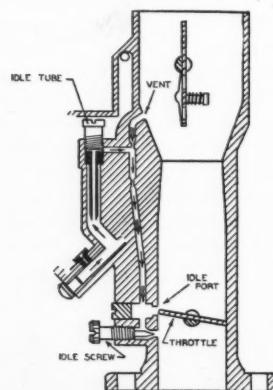
about a 45 deg. angle toward the back of the car instead of being vertical. This allows the ball to roll up the incline to its seat rather than making it necessary for the vacuum to lift it vertically off its rest and to the seat.

There are two possibilities that might be causing that poor idle in



the 1940 Nash Lafayette. The first is that the idle tube and the idle passage in the carburetor could be partly plugged so that you are not getting good operation at this point. I would suggest that you remove the carburetor and blow out the idle tube with compressed air. Do not run a wire down in this tube but if you feel that something on that order is needed, I would suggest that you use a few drops of acetone. I assume you have checked for air leaks and that there are none so we can eliminate them as a source of trouble.

The next point I would check is the operation of the automatic choke. I understand there were some difficulties in the early design of this model and it was since changed to prevent a sticking condition which, of



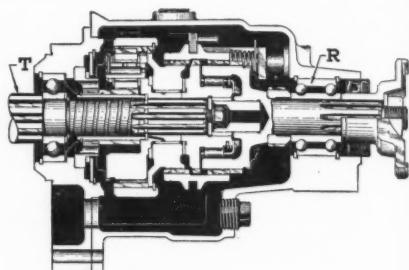
course, interfered with the operation of the engine. A replacement parts package was issued to correct this trouble and you can buy it from your Nash dealer under part number 3105227. If, after cleaning out the carburetor, you do not correct the trouble, I would suggest the installation of this parts package.

OVERDRIVE SHIFTING

Will you give me the construction and operation of the different units used in the overdrive of a 1940 Packard Super 8. Is it permissible to shift the control unit of the overdrive while the car is operating at different speeds, or must the car be slowed down and the shift then made?

On the car in question the overdrive apparently works all right but the tell-tale light on the dash works sometimes when the overdrive is not working, and at other times when the car is in overdrive the light will not light.—R. H. Prom, Los Angeles, Cal.

THE shift from the conventional drive to the overdrive is made automatically at a car speed above 22 m.p.h. by simply lifting the foot from the accelerator pedal and then depressing the accelerator pedal as in normal driving. This takes place while the lockout knob on the instrument panel to the right of the steering gear column is pushed in toward the front of the car. The car will continue to operate in the overdrive gear until its speed falls below about 17 m.p.h., or until the foot accelerator is pushed all the way down to the floor for a rapid acceleration.



To shift from the overdrive into conventional, the car must be in motion and at a speed under 60 m.p.h. Simply depress the clutch pedal and pull the knob out from the instrument panel. This shift should not be made when the car is standing still.

HELP WANTED

I am trying to find a place where I can get repair parts for the old Stanley Steamer. I have 2 White steamers of 1909 and 1910 vintage, and two Stanleys of 1915 and 1916 models. The Whites are in good running condition, but one of the Stanleys, a 30 hp., 12-passenger Road Wagon, is badly in need of engine main bearings.

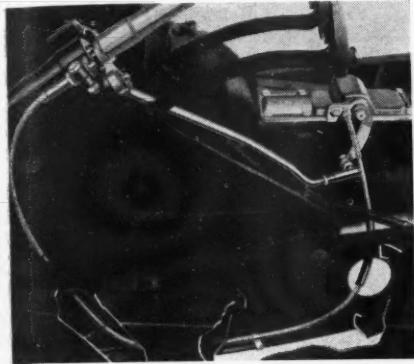
Maybe some of the boys have had some experiences with these old babies and can tell me where I can get some new bearings.—J. Reed Feese, Alma, Neb.

GEAR SHIFT ADJUSTMENT

Please furnish instructions on how to adjust the gear shifter on the 1940

and 1941 Plymouth, and also state reason why 1940 Plymouth jumps out of second.—Lawrence Colbrese, Glendive, Mont.

THE Plymouth transmission is adjusted with all slack removed when the gears in the transmission are in the neutral position.



The gearshift control rod should be adjusted at the bottom of the steering column so that with the gears in neutral, the gearshift lever at the steering wheel is slightly above the horizontal position.

The adjustment of this mechanism will very likely correct the complaint of jumping out of second gear unless, of course, the second speed gear snap ring which holds the gear to the spline shaft is broken. If this is the case, a new snap ring will have to be installed.

OIL LEAK

I am writing you in regards to an oil leak through the rear main bearing of a 1934 B Ford. We overhauled this motor, honed the block putting in new pistons, rings, pins, rods, timing gears, valves and guides. This motor runs perfect, vacuum is perfect and does not smoke at the exhaust, but has a leak at the rear main bearings, leaking out at the bottom of the flywheel housing. We have done everything we know to do, and things that would stop it on an ordi-



"And with each set of tires we throw in a swell used car free."

nary motor. The rear main is in perfect shape.

We took the pan down the first time and drilled a 5/16 in. hole down through the center of the bearing to the oil return hole which did not help it in the least, then we pulled the motor to be sure the gasket between the block and flywheel housing was in good shape and it was, but put in a new one and then cut an oil groove from the front of the bearing back to the hole we drilled, which helped us none either.

We cleaned the ventilating holes in the plate on the flywheel housing; also cleaned out the breather pipe and tried running the motor with the

cap off, but nothing helped so we are asking you for your advice.—Tracy Loy, Hitchcock, Okla.

I CANNOT agree with your statement that the rear main bearing is in perfect shape, because if it were it wouldn't permit this oil leak. I believe the only way you will be able to overcome this trouble is to have the crankshaft reground, and then install a new undersize rear main bearing. It is my opinion that the rear main bearing journal is worn out of round, and the rear main bearing cap has been filed in an effort to tighten the bearing.

Replace it with a New Departure . . .

the same bearing that
competent engineers
choose for the majority
of original installations.



Authorized replacement
bearing service wherever
you see this sign. Authentic
records—complete stocks—
sudden service.

NEW DEPARTURE THE FORGED STEEL BEARING

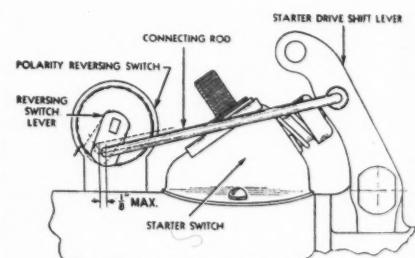
Service

FROM THE

Testing Reversing Switch

When difficulty is experienced in starting the 1941 Chevrolet, check the operation of the current reversing switch. Turn the ignition switch on, and the ammeter should show a discharge. Push the starter pedal down slowly, watching the ammeter. If the reversing switch is operating properly the ammeter needle will return to Zero when the starter pedal is part way down, and as the pedal is pushed farther the needle will again show a discharge.

Just before the starting motor operates you will hear a click in the reversing switch, indicating that the ratchet has locked in the closed circuit position. Check the position of the switch lever when this click is heard, and watch the travel of the



lever as the starter pedal is depressed farther and contacts the starter switch. The lever should not move more than $\frac{1}{8}$ in. in a horizontal direction after the click is heard; if it does, bend the rod connecting the starter drive shift lever and the reversing switch lever in the middle to make it shorter.

Water in Parking Lights

When there are cases of an accumulation of water in the parking lights in the 1941 Studebaker cars, apply the following correction:

Remove the headlight bulb retaining rim door.

File out the groove below the parking light lens to make the groove $1/32$ in. deeper.

Cut away the rubber gasket at the lower end, beginning at the gap in the vertical face of the gasket at the bottom of the headlight housing. Cut away the entire vertical face of the

RAMCO MFG. COMPANY

Best Spring Tonic!

RAMCO DOUBLE LIFE PRINCIPLE

Insures a cushion of cast-iron on cylinder wall . . . the inner ring spring tension is on the cast-iron segment . . . not the steel!



RAMCO PISTON EXPANDERS

exert pressure only against the thrust sides . . . the only sides that need expansion! For all pistons including Ford Steel and Chevrolet cast-iron pistons.

Hints FACTORIES

gasket at the gap and then taper off for a distance of about $\frac{1}{2}$ in. to prevent the vertical face of the gasket from sealing against the headlamp rim.

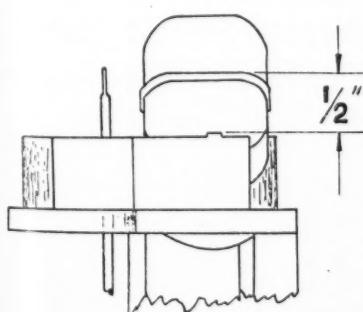
Run a knife-edge along the edge of the headlight body at the gap in the gasket to remove any portion of the gasket which projects below the headlight body after the rim or door is replaced.

Hard Starting When Hot

Some of the early Model C-30 Chrysler cars may experience hard starting difficulties when the engine is warm. To eliminate this possibility the factory has made available a drain tube to be attached to the intake manifold, and which will provide a drain for any flooding or puddling of gasoline that may take place in the manifold. Part number 637590 drain tube and part number 381575 elbow should be installed.

Float Level Change

The Service Department of Pontiac has advised that the carburetor float level of the 1941 6-cylinder model should be set at $\frac{1}{2}$ in. instead of $\frac{7}{16}$ in. as given in the shop manual. This means that when setting the carburetor float level of the 1941 6-cylinder Pontiac, remove the bowl cover and turn it upside down—measure the distance from the top of the projection on the bowl cover to the top of the



soldered seam at the free end of the float. This distance should be $\frac{1}{2}$ inch with the needle seated. Bend the lip on the float which contacts the needle to adjust this distance.



To pep UP sales of Used Cars and Ring Jobs

- Dealers close more prospects when they use the Ramco 10,000 Mile Ring and Labor Guarantee . . . and tell the customer it is the strongest guarantee ever placed back of a piston ring . . . a guarantee that is better than a new car ring guarantee!

Build your Spring Tune-Up and Used Car Sales Campaigns around the Ramco 10,000 Mile Guarantee Program. For details see your Ramco Jobber or write Ramsey Accessories Mfg. Corp., 3711 Forest Park Blvd., St. Louis, Missouri; Canadian address: 144 Front St., W., Toronto, Ontario.

Copyright, 1941, Ramco.



Truck Tune-Up and Repair Data

Truck Tune-Up and Repair Data—Continued

Rickenbacker 'Okay for a Good Finish'

Capt. Eddie Rickenbacker, World War ace, and president of the Eastern Air Lines and the Indianapolis Speedway, who was injured in the crash of a sleeper plane near Atlanta last month, was reported at the time of going to press to be improving rapidly.

Rickenbacker's gameness, demonstrated again when, though painfully injured, he cautioned other passengers in the wreckage of the plane against smoking, lest a match ignite

the gasoline that soaked the plane, is shared by his wife. When a newspaper wired Mrs. Rickenbacker for information on her husband's condition, she wired in reply:

"Latest pit stop. . . . Rickey has plenty of gas, oil, tires okay for a good finish."

Heads Jack Division

Roy P. Williamson has been named sales manager of the Jack Division of The Buda Co. of Harvey, Ill., effective immediately.

He was until recently associated with the Gustin-Bacon Manufacturing

Co. of Chicago and St. Paul, and has been identified with the railroad supply business for many years. He is a member of many railroad group associations including the Western Railway Club of Chicago.

50 National Groups Unite To Cut Traffic Accidents

Impelled by the realization that every accident delays defense, 50 national organizations, united in support of a standard highway safety program, have redoubled all essential traffic accident prevention efforts, it was announced here today by Norman Damon, director of the Automotive Safety Foundation.

More than 15,000,000 persons are included in the membership of the organizations collaborating in the concerted drive for safe and orderly traffic. Continuing sharp increases in the current traffic accident totals indicate the urgency behind this widespread effort to save lives and injury.

Every accident that results in injury or death to a defense worker or a man available for military duty, directly retards the defense program, it was pointed out. "During 1940, 16,000 workers in trade and industry were killed in traffic," Damon said, "as compared with about 2000 killed in manufacturing plants. About 12,000 occupational fatalities occurred last year in all trade and industry, plus 4200 fatal accidents in agriculture.

"More important to defense production than the fatalities were 600,000 traffic injuries suffered last year by industry workers."

George W. Fleming

George W. Fleming, president of the George W. Fleming Co., Inc., of Plantsville, Conn., died on Feb. 9.

Beginning in the machine tool business as a mechanic, he quickly graduated to selling and for many years was one of the outstanding machine tool salesmen in the New England territory. He became interested in automobile service machinery and invented many tools and automatic machines for the rapid and accurate servicing of automotive vehicles. He formed the Fleming Machine Company for the manufacture and sale of precision tools for automotive mechanics.

In 1930, he became vice-president and general sales manager of Stevens-Walden, Inc., from which he retired because of illness in 1932.

Next, he organized the George W. Fleming Company for the manufacture of motor-driven pumps.

Fleming was very active in association work, having at one time been a director of the Motor & Equipment Manufacturers Association and, later, chairman of the Small Tool Division.

He is survived by his widow and two sons, George, Jr., and Frank.

Immediate
NATIONWIDE
Service

JOHNSON
Slip-in BEARINGS

The next time you need bearings—try Johnson Bronze. You will save both time and money. Complete stocks . . . for every type of car . . . are carried in every principal city. Delivery can be made the same day your order is received.

Johnson *Slip-in* bearings cost less per job . . . less per mile. Correct in every dimension, they slip right into place with the minimum of effort. The high standard of quality of all Johnson bearings enables you to guarantee every installation. Ask your jobber—today—for Johnson *Slip-in* Bearings.

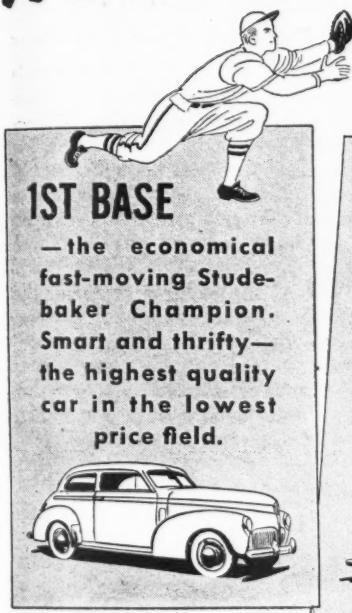
**Write for
FREE
Catalogue**



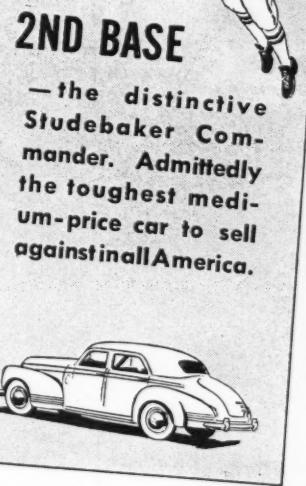
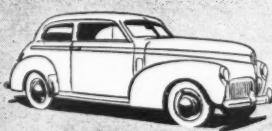
JOHNSON BRONZE
Sleeve BEARING HEADQUARTERS
455 S. MILL STREET • NEW CASTLE, PA.

Head for a Pennant in 1941

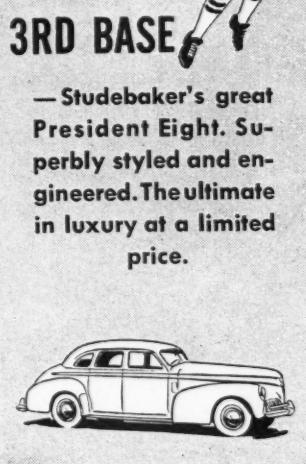
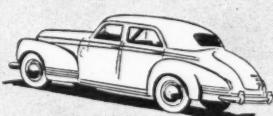
*with this
"million dollar infield"*

**1ST BASE**

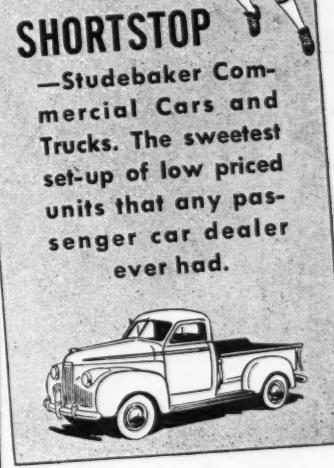
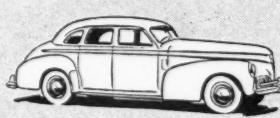
— the economical fast-moving Studebaker Champion. Smart and thrifty—the highest quality car in the lowest price field.

**2ND BASE**

— the distinctive Studebaker Commander. Admittedly the toughest medium-price car to sell againstinall America.

**3RD BASE**

— Studebaker's great President Eight. Superbly styled and engineered. The ultimate in luxury at a limited price.

**SHORTSTOP**

—Studebaker Commercial Cars and Trucks. The sweetest set-up of low priced units that any passenger car dealer ever had.



WITH Studebaker's brand new Skyway Series models to offer your public in the President and Commander, here's a ground-covering infield that's a sure-fire pennant contender in *any* league! When you sign up this great line of cars, you step into a big-money line-up. You get a chance to drive in runs every time you come to bat, because your Studebaker franchise gives you complete coverage of every car or truck prospect in your territory.

Studebaker is pitching winning ball for over 3500 successful dealers—more than 1200 of them joined the all-star Studebaker team last year alone.

If you're interested, write or wire in confidence today, to Paul G. Hoffman, President, The Studebaker Corporation, South Bend, Ind.

Cash in on these five money-making

STUDEBAKER ADVANTAGES

You feature just one name—Studebaker

You make just one investment

You pay just one overhead

You carry just one line of parts

You do business with just one factory—the friendliest, liveliest factory in the business—Studebaker!

*Read what this
successful dealer
has to say about
Studebaker's
"complete coverage" line*



"Trenton is a tough city to break into"—that's what other dealers told me. But Studebaker's 'complete coverage' line has certainly clicked for me in this territory. I have been in the automobile business all my life and never more successfully than right now in Trenton."

Samuel F. Keats

Thermoid Broadens Brake Service Merchandising Plan

A further extension of the program that has been built around Precision Process Brake Service is announced by Thermoid Co., Trenton, N. J. The availability of the Precision Process method, originally offered by Thermoid distributors through Brake Shoe Exchange Service, was broadened a year ago with the introduction of the Cadet Burnishing machine. Thermoid made this new machine available to dealers on the "Pay-as-you-Profit-Plan."

The program has now been further

developed as the basis for a complete dealer brake service department with the following pieces of equipment available in a "Precision Process Deal":

Cadet Burnisher—Burnishes lined brake shoes to exact drum diameters. Thermoid states this is the only equipment being offered to the retail trade which matches car factory precision methods.

Drilling, Countersinking and Riveting Machine—A sturdy low-priced unit that will accommodate any size brake shoe up to 3½".

Hydraulic Brake Analyzer—A newly developed device with many unique advantages. Immediately locates hidden leaks or defective units in any part of the hydraulic system.

The "Brake Mike"—Assures accurate

adjustment of the shoes in the brake assembly for complete lining-to-drum contact. Also checks drums for distortion and wear.

Brake Bleeder—A small, compact, hydraulic brake pressure bleeder. Requires no compressed air and can be operated easily by one man.

DeLuxe Cabinet—A strong, attractive metal cabinet for stocking and displaying brake lining sets and rolls.

Metal Awning—For prominent identification of the brake service department.

For the shops already owning some of this equipment—each of these units is available separately in other deals. A generous amount of new sales-building Thermoid advertising and merchandising material is furnished with each deal.

Nash February Sales Up

156 Per Cent Over Last Year

A picture of automotive sales trends throughout the United States appears in an analysis of Nash Motors' record-breaking sales in February, when the company increased its sales 156 per cent over last year, revealing a surprisingly even distribution of good business over every part of the country.

A study of the reports covering the best February sales in Nash history, according to W. A. Blees, general sales manager of the company, shows very few geographical areas in which business activity is not responding fully to the general upward sweep in sales. In no area, he declared, has acceptance of the company's newest automobile, the "mass market" Ambassador '600,' failed to boost Nash sales very considerably, the lowest gain in the country running in excess of 100 per cent.

Best percentage increase in the nation was shown in the Pacific Coast states which form Nash's "Pacific" region, managed by M. N. Larson. During February this region registered a gain of 182 per cent over the same month last year, and some of the distributor-point gains were the greatest on record. Salt Lake City, showing the largest percentage gain in the country, lifted its sales 368 per cent; Seattle gained 258 per cent and Portland, 205 per cent. Sales in Los Angeles and San Francisco jumped 2½ times last year's figure.

Sterling Expands

Work has begun on the construction of the \$500,000 addition to the Sterling Engine Co. plant at 1270 Niagara St., Buffalo, N. Y., according to an announcement by Addison F. Vars, president. The new building, providing about 75,000 sq. ft. of floor space, will be ready by September, and will be used for the assembling and testing of Sterling Admiral engines, now required by the U. S. Navy and British Admiralty for powering small, speedy craft such as motor torpedo boats. Robert E. Williams & Sons Co., Inc., of Buffalo, are the general contractors.

TUNE-UP CHART
For 1930 to 1940 PASSENGER CARS
13 Columns of Distributor, Starter, Generator and Motor Adjustment Data.
5 MINUTE VOLTAGE REGULATOR TESTS
ALIGNING BREAKER POINTS
SERVICING BREAKER PLATES
A QUICK COIL CHECK
ALL ABOUT CAM ANGLE
USING A LOW-READING VOLTMETER
SERVICING V-8 DISTRIBUTORS
MONTHLY SERVICE BULLETINS
BLUE STREAK SERVICE BULLETIN

THIS PRICELESS TUNE-UP DATA
free

INFORMATION YOU MUST HAVE FOR ACCURATE TUNE-UP



Write for full particulars

STANDARD MOTOR PRODUCTS, INC.

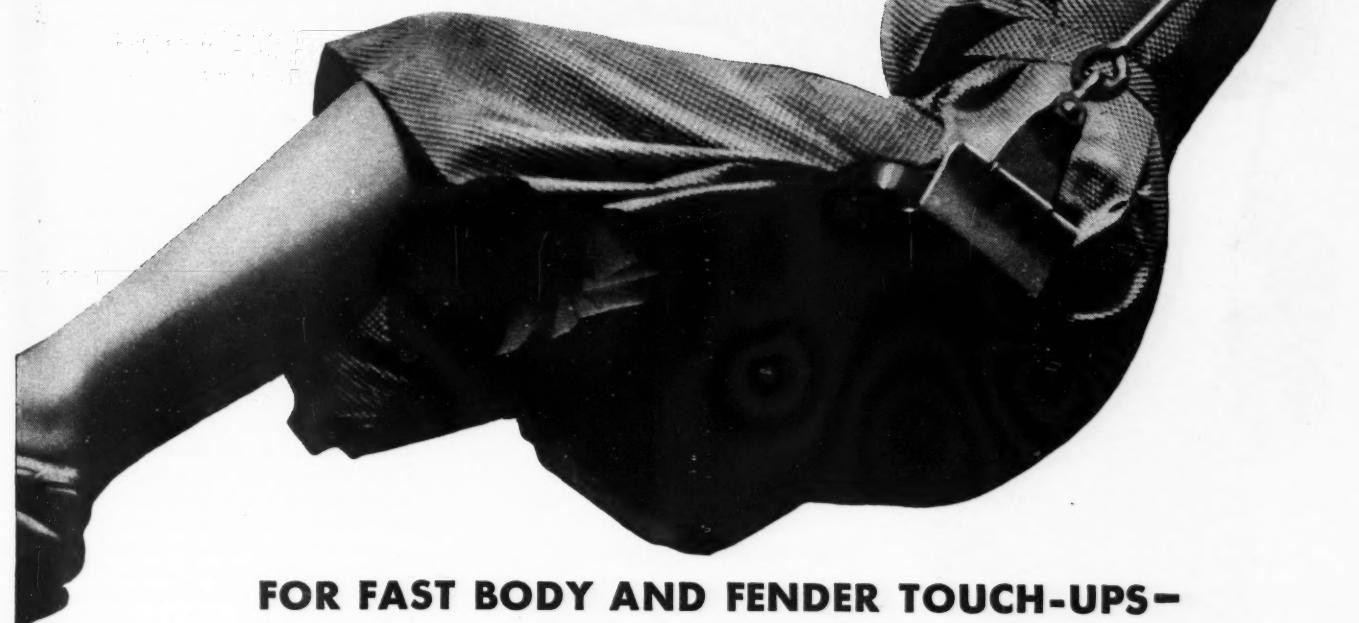
Main Office and Factory
37-32 Northern Boulevard
Long Island City, N. Y.

"The ABILITY to serve well is as important as the WILL to do so."

**THE SWING
Is To...**

EBONBLAK

REG. U. S. PAT. OFF.



**FOR FAST BODY AND FENDER TOUCH-UPS—
CAN BE COMPOUNDED IN ABOUT ONE HOUR**

► Speed up your touch-ups and spot repairs with Du Pont EBONBLAK. Designed for fast work, it hardens much quicker, permits polishing sooner, can be compounded more quickly without taking on a gray tone. For speedy work you can't beat EBONBLAK! E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Refinish Sales, Wilmington, Delaware.



REFINISHING MATERIALS

Detroit Police Dept. Gets New Safety Car

A contribution toward greater safety on Detroit streets was made recently by Chevrolet Motor Division, when a new 1941 car was presented by Chevrolet to the Public Safety Bureau of the Detroit Police Department.

Designed for safety education work, the four-door special deluxe sport sedan carries a public address system, with two loudspeakers mounted on the top. The unit will be manned by a special two-man crew from the Public

Safety Bureau, consisting of Officers Charles Taylor and Charles Izzard.

On a "cruising assignment," the new safety car will cover the entire west side of Detroit. The unit will appear at parks and playgrounds, at picnics, at meetings of all sorts, where the officers in charge will deliver safety talks, with special emphasis on pedestrian control. Likewise, the unit will cover various busy intersections during rush hours, in an effort to reduce accidents.

The new 1941 Chevrolet is the fifth that Chevrolet has presented to the Public Safety Bureau.

AC Dealers Get

"Oil Test Pads"

A large number of dealers have been enjoying substantial increases in the sale of oil changes, oil filter elements and oil filters through the use of a special paper tissue for wiping dip sticks. The tissues, or "oil test pads" possess a characteristic that enables both the motorist and the service man to more easily tell the condition of the oil.

Last year the "oil test pads" were distributed to registered dealers by the AC Spark Plug Division of General Motors through that concern's wholesalers during a campaign on AC oil filters and oil filter elements.

Because of the tremendous success the dealers are having with the oil test pads, AC now is expanding the activity in its current highly advertised 1941 oil filter sales campaign. In addition to the test pads, which come in a smartly designed cardboard box, an attractive weather-proof metal dispenser to house the cardboard box, is being supplied registered dealers at no cost through AC wholesalers. The metal dispenser is colored yellow and black and lends itself to outside as well as inside installations.

Frohman in the Army

Lt. Col. Louis H. Frohman, executive of H. B. LeQuatte, Inc., New York advertising agency, has been ordered to active duty for one year at Camp Lee, Virginia.

The LeQuatte agency and Colonel Frohman have long been identified with automotive merchandising, currently handling such well known products as Raybestos brake lining, Edison batteries and spark plugs, and Whiz automotive chemicals, as well as all other Hollingshead lines.

Colonel Frohman retains his contact with the automotive industry while in the service, as he is in command of a motor transportation battalion.

Tire Repairing Manual

The fourth edition of the Manual of Tire Repairing has been issued recently by the Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y. The manual comprises 40 pages dealing with sectional repairing and contains detailed information covering inspection, preparation, building and curing of repairs. Copies may be secured directly from the R.M.A. at the above address by enclosing 10 cents for each copy desired, or they may be secured through tire manufacturers who supply repair materials.



To give your customers improved bearing performance at no advance in cost—to turn out smoother, quieter more serviceable jobs—use Bower

Tapered Roller Bearings
famed for "Super-Finish"

No "Run-In"—No "Final Adjustment"

For your convenience, Bower Tapered Roller Bearings are distributed exclusively by more than 800 Authorized Ahlberg Wholesalers. Your Jobber's Salesman will promptly fill your roller bearing needs—as a part of the "All-Bearing" service he is well equipped to give.

**Ball, Roller, Thrust — Get the Bearings You Need — When You
Need Them — from Your Jobber**



Ahlberg Bearing Company

Manufacturers of [CJB] Master Ball Bearings
3028 WEST 47th STREET — CHICAGO — 30 WAREHOUSE BRANCHES
Out West its PRECISION BEARINGS, INC. Los Angeles

Kimble-Imperial

Offer New Tester

Announcement has just been made that two prominent manufacturers, The Imperial Brass Manufacturing Co. and the Kimble Glass Co., are co-operating to produce and distribute a new and finer line of battery hydrometers and anti-freeze testers to be known as Imperial "K" Testers.

Both companies have for years manufactured such testers independently and each concern will retain its own identity and their other products will not be affected by the collaboration.

The first models of the new line are to be shown very shortly. It is to be expected that the joint resources of these two leading manufacturers will produce some really important improvements.

Reports indicate that the new testers will offer many more practical features and greater dependability and service.

The Kimble Glass Co. is located in Vineland, N. J., with additional plants at Conshohocken, Pa., Indianapolis, Ind., and Chicago Heights, Ill. Organized in 1901 the company has become very well known as a maker of quality glassware for chemical, biological and metallurgical laboratories. Five years ago high grade battery testers and freeze testers were added to the company's line and are used widely today.

To this unexcelled knowledge of glass manufacture Imperial Brass adds almost 50 years of manufacturing and merchandising experience. The company's line of brass fittings, fuel lines, valves and other allied brass products have long been recognized as standard in the field of automotive servicing. The Imperial factory is located at 1200 West Harrison Street in Chicago, Ill.

Frank S. Barks

The death of Frank S. Barks, president of Lincoln Engineering Co. of St. Louis, has been announced by the officials of the company. Mr. Barks left St. Louis Dec. 26 for an extended trip to South America, and was returning by steamship from Rio de Janeiro to New York when death occurred Monday, Jan. 27, as a result of cerebral hemorrhage. He was 58 years old and had been active in his business and social affairs until within four weeks of his departure for South America. Funeral services were held in St. Louis Feb. 6 and burial was in the Barks family plot at Ansley, Neb., Feb. 8.

Mr. Barks was born and raised in Nebraska and was educated at Doane College and the University of Nebraska. His early business training was with the Union Pacific Railroad, first as a machinist apprentice and

later in the engineering department. In 1908 he came to St. Louis and entered the employ of the Commonwealth Steel Co. In 1912 he purchased controlling interest in the Steel Roof Truss Co. with plant at Valley Park, Mo., out of which eventually grew the St. Louis firm, now known as the Lincoln Engineering Co. Under his guidance the company has grown steadily from a small beginning with 25 employees to the present well-known organization with more than 500 employees. In the course of this development several additions have been made in recent

years to the factory on Natural Bridge Ave. in St. Louis, and in 1935 operations were extended to Detroit where a second factory was established.

A.E.R.A. Convention

The headquarters office of the Automotive Engine Rebuilders Association in Indianapolis is the scene of much activity in preparation for their nineteenth annual convention and show which will take place May 22, 23 and 24 in the Hotel William Penn, Pittsburgh, Pa.

**"New Bearings, make jobs run FINE,
CALL ON YOUR JOBBER'S AHLBERG LINE"**

WHEN an overhaul job calls for Ball, Roller or Thrust Bearings, your Jobber's complete Ahlberg line and his close contact with the special facilities of the local Ahlberg Branch give you fast, economical service. You can be sure he'll supply you promptly with bearings that are right at prices that are right.

**More than 800 Authorized Wholesalers
Give Ahlberg All-Bearing Service**



Ahlberg Bearing Company

Manufacturers of CJB Master Ball Bearings
3028 WEST 47th STREET - CHICAGO - 30 WAREHOUSE BRANCHES
Out West at PRECISION BEARINGS, INC. Los Angeles

Women Begin Training as Auto Technicians

More than 80 New York housewives, business women, college students and young homemakers attended the opening session in March of America's first nation-wide school to train women as automotive technicians for emergency defense work.

Announced in over 50 other cities—but formally "premiered" in New York—the course, conducted by Willys-Overland Motors, Inc., already has enrolled several thousand housewives and business women from coast to coast who are anxious to equip them-

selves for active participation in the emergency defense program, company officials said.

The initial session of the course was given in Willys' main New York showrooms and will serve as a general pattern for similar schools throughout the country. It offered an introduction to the basic principles of an automobile engine; subsequent sessions will deal with various aspects of automobile mechanics, including motor repair work, tire changing and handling of trucks and ambulances in crowded and difficult traffic.

While the 10-week course is in progress, a number of well-known

safety and automobile experts will give lectures on automobile construction, maintenance and motor repair work.

Nor'Way Banner Year

In its twenty-first annual report, for year ending Dec. 31, 1940, the Commercial Solvents Corp., best known to the automotive trade as the manufacturer of Nor'Way Anti-Freeze, reports total net sales for 1940 of \$15,844,930.44, an increase of 9.4 per cent over 1939.

Net earnings of \$2,387,321.43 amounted to 90.5 cents per share, as compared with \$1,600,389.97 or 60.7 cents per share in the preceding year. This creditable showing was made despite an increase in Federal income and excess profits taxes of \$441,636.38 imposed in connection with the national defense program. Federal taxes for 1939 were \$249,531.99.

A dividend of 25c. per share was paid on the 2,636,878 shares of common stock, and the corporation ended the year with total assets of \$20,915,131.47, a ratio of current assets to current liabilities of 8.9 to 1, as compared with 5.4 to 1 at the end of the preceding year.

Commercial Solvents has announced a plan to considerably broaden its list of automotive products with the introduction of a new anti-freeze of the "permanent" type, together with several other chemical specialties for cooling systems.

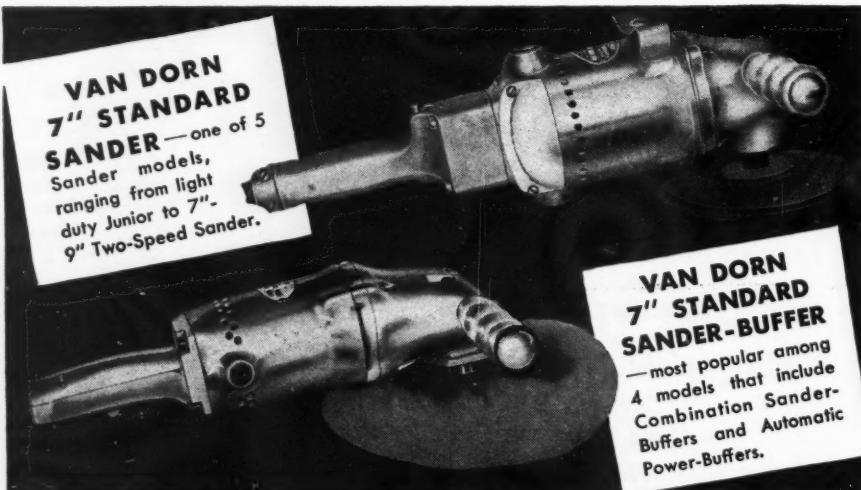
Powers Made Manager

Marion T. Powers, former executive in the Chrysler sales division, has been named general manager of the C. E. Ray Co., Chrysler and Plymouth distributor in the Boston area.

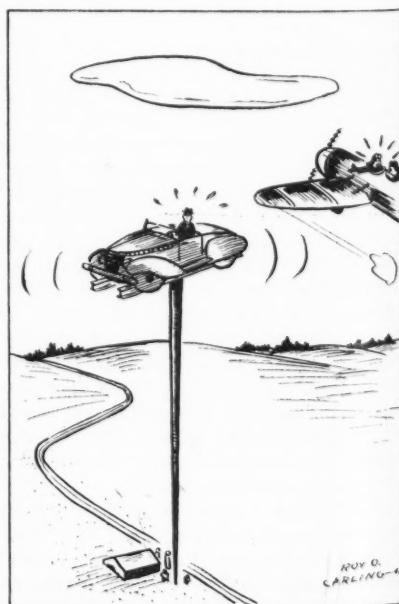
Declare a "BLACKOUT" on Elbow Grease!

It's plenty tough work, when you have to sand and polish cars by hand or out-dated equipment. Smart shop owners get rid of all the hard "elbow grease" by switching to VAN DORN Electric Sanders and Buffers. Fastest tools you ever saw for removing tar and dirt from under fenders, taking off paint and rust, sanding fenders and bodies, rubbing down lacquer and for buffing finish to restore gleam of original paint job. From Van Dorn's 9 Sander and Buffer models there's one waiting to help you make more money—*easier*. Ask your jobber to show it to you today! Or write for complete information to: Van Dorn Electric Tools, 727 Joppa Road, Towson, Maryland.

VAN DORN PORTABLE ELECTRIC SANDERS AND BUFFERS



"Van Dorn"
(DIV. OF BLACK & DECKER MFG. CO.)
**THE "RED
HEADED" PORTABLE ELECTRIC TOOLS**



"Maybe he wouldn't pay his bill!"

Fire Extinguishers

Need Regular Care

Fire extinguishers, to be instantly available for use at all times, must be properly recharged and inspected. The date of recharging should be noted on the tag provided for that purpose, along with the name or initials of the man doing the work.

Fire insurance underwriters recommend that only recharging materials and replacement parts furnished by the manufacturers of the extinguishers be used in service work. Full instructions for recharging the various types of extinguishers are given on the labels and they should be followed to the letter.

When the 2½-gallon units are recharged, all parts should be washed thoroughly in water and the water drained through the hose. The shell should be examined to make certain it is sound at the seams, for, after all, it is a pressure container. The head gasket and hose should be examined for signs of deterioration, and the strainer should be cleaned.

When the cap is screwed back on the shell, the worker should make certain that at least four threads are engaged. A small amount of vaseline may be placed in the threads to make the task easier and facilitate removal for the next recharging.

All chemical solutions should be mixed in clean containers and not in the shell of the extinguisher, and the container should be carefully rinsed before being used for a new solution.

Only liquid obtained from the manufacturer should be used in the vaporizing liquid type extinguisher. The use of commercial carbon tetrachloride, which may contain some water or chemical impurities, is likely to damage the interior of the extinguisher or, if used on live electrical equipment, endanger the operator.

Directions for inspecting and recharging the various types of extinguishers follow:

Soda-acid: Recharge annually. If exposed to temperatures below 40 degrees F., place in suitably heated cabinets. Do not mix anti-freeze crystals with the solution.

Foam: Recharge annually. Anti-freeze ingredients should not be added to the solution and, if exposed to temperatures below 40 degrees, extinguishers of this type should be kept in suitably heated cabinets.

Vaporizing Liquid: Recharge after use and keep unit filled at all times. Test action of pump by discharging a portion of the liquid into a clean, dry container. The test liquid can be poured back through the filler opening. Guard against overfilling. No lubricants should be used on the piston of this type of extinguisher, nor should any water be placed in it.

Loaded stream: Recharge after use; inspect annually to see if container is filled and that hose and gasket are in good condition. Weigh carbon dioxide cylinder and replace it if it has lost one-half ounce. Extinguishers of this type may be exposed to temperatures as low as 40 degrees below zero F.

Carbon dioxide: Recharge after use; inspect annually to note if seal is intact. Weigh the unit to make certain weight is equal to that stamped on it. Loss of 10 per cent in weight indicates the need for recharging.

Anti-freeze, pump tank: Recharge after use; inspect annually to make certain it is filled to filling mark. Test pump action by operating pump for several strokes, directing the stream back into the tank.

Anti-freeze, other types: Recharge after use; inspect annually to see if container is filled and that hose, gasket, etc., are in good condition. If carbon dioxide is used for pressure, loss of one-half ounce in the weight of the cylinder is cause for replacing it with a new one.

Exclusive!

"THESE KITS SURE STRETCH
SALES AND DO THE JOB BETTER!"

McQUAY-NORRIS
Ring Specialist Kit

FOR FORDS, PLYMOUTHS, CHRYSLERS

**only McQUAY-NORRIS offers
THE 3 MOST VITAL PARTS
IN THE CONTROL OF OIL IN
1 PACKAGE... 1 JOB NUMBER
... LOWER PRICES**

1 Altinized Engineered Piston Ring Sets
**2 Special Undersize, Triple Altinized
Con Rod Bearings**
3 Engineered Piston Expanders

Exclusive! 4 Different Types OF STEEL OIL RINGS ARE NECESSARY TO MAKE *Engineered* PISTON RING SETS

LEGALLY SPEAKING

A lawyer's interpretation of Federal and local court decisions of interest to repairmen, presented each month

by C. R. ROSENBERG, JR.

Volume of Sales Uncertain

A CONTRACT may be found to be invalid and unenforceable because some of its essential terms are "uncertain" or "vague." In a recent case involving a contract for a sales agency it was urged that the contract was invalid for "indefiniteness" because it did not specify the quantity the sales agent was to sell.

"A contract of sales agency," said the Federal court, "is not void for uncertainty or indefiniteness because no definite quantity is named in the contract. Where territory is to be exploited and orders to be solicited, the number and amount of such orders cannot be foretold. They can be determined only by the potential demand of the territory and the diligence of the salesman. Hence contracts of sales agency are not invalid for such uncertainty — as to sales volume."

A reminder that it is not legally essential to specify the volume of sales when a repairman signs a sales agency contract!

When Is Rent Payable?

If a repairman does not pay his rent, he may be dispossessed and subjected to all the other penalties that the lease provides for. Under some leases he may lose his right to continue in the building if he is one day late in paying his rent.

So it's important to know the exact day on which rent is payable. If the lease says that the rent shall be paid "promptly on the first of each month," does that mean that the September rent is to be paid on October first or that the October rent is payable in advance on that date?

"Such a provision for payment," says the Court of Appeal of Louisiana, "refers to the first day of the month for which the rent is due."

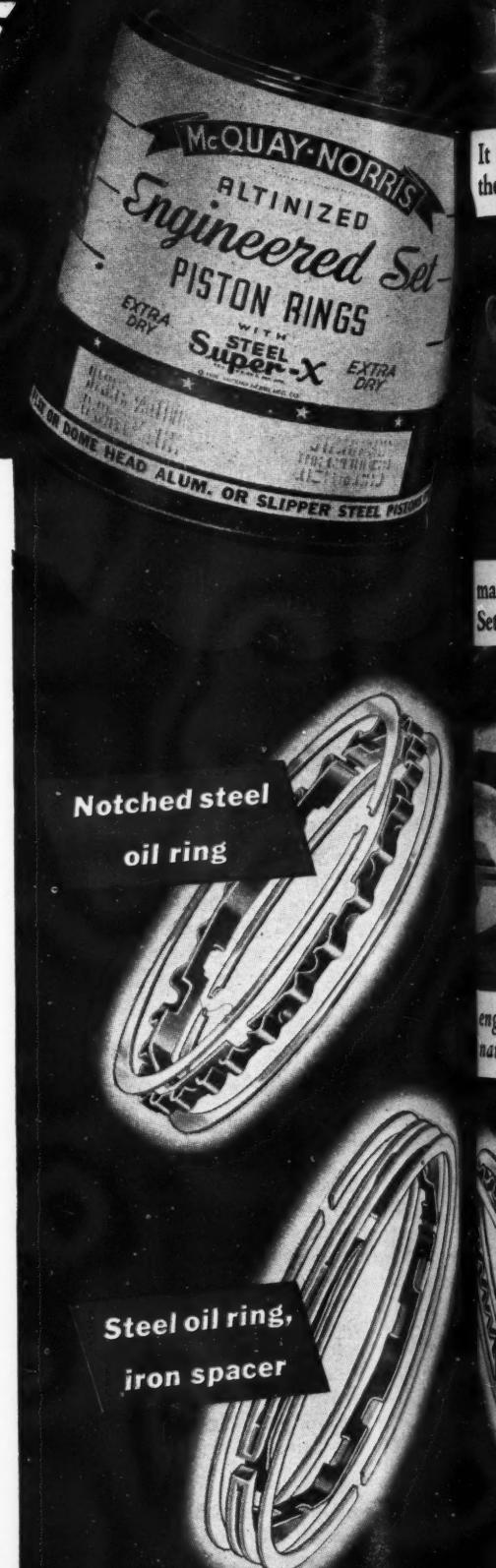
In the Louisiana case the tenant urged that the rent was not strictly due in advance on the first of each month, because he had actually been paying the rent after the first of the month and at irregular intervals.

"The fact," said the court, "that the rent payments made at irregular times were accepted by the landlord does not aid the tenant. At no time did the landlord agree to the irregularity of payment as practiced by the tenant."

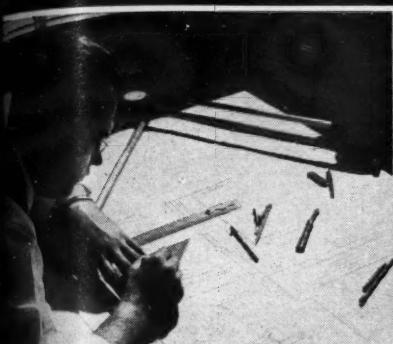
Failure to pay the rent strictly in accordance with the terms of the lease is an invitation to the landlord to crack down and take possession of the building. That's a special hazard for a repairman who has a low rental lease for a long term in a district where rents are rising.

Is a Check Payment?

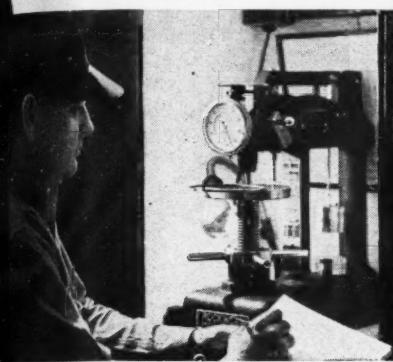
A REPAIRMAN accepts a customer's check in payment of an overdue account. The check goes bad and the repairman sues the customer for



McQUAY



It takes engineering all along
the line to



make Engineered Piston Ring
Sets that are



engineered in fact as well as
name!

the account. The customer then says that the repairman accepted the check in "payment"; that, in effect, when he took the check he relinquished whatever claim he had on the account.

It can happen that way if the repairman takes the check in "absolute payment" and it is so understood and agreed by both sides. But unless there is such an understanding at the time the check is turned over, the check is only "conditional" payment, the condition being that the check will be honored when presented at the bank on which it is drawn.

"A check," says the Supreme Court of Oklahoma in a recent case, "without regard to whether it is the check of the debtor or that of a third person, does not constitute payment unless it is agreed that it shall be taken as an absolute payment."

If nothing is said when the check is received, the payment is conditional subject to the check's being good. A check is never absolute payment unless it is so agreed at the time it is taken.

When Checks Go Bad

WHEN an agent or employee delivers goods or service to a customer in return for a check that goes bad, may the agent or employee be required to make good the check? That question was recently before a Federal court in a case where a business concern was trying to make its agent pay the amount of certain bad checks he had taken from customers.

"There is no provision of the contract between the business house and its agent," said the court, "prohibiting the agent from making cash sales and accepting checks of responsible customers in closing the transactions. It cannot be assumed in the light of modern custom that the agent must

in all cash transactions demand coin or currency. Nor is there any provision in the contract imposing liability on the agent to make good dishonored checks. The agent would be liable for accepting, negligently, the checks of persons of whose bad financial standing he had notice or knowledge, but no claim of such negligence is alleged here."

In the main or "home" building of a repairman's business it is easy to control this check problem by requiring that every check be approved by someone in authority. But in the case of agents or employees operating at a distance very definite rules should be set up

Law Favors Compromise

IF a repairman has a claim against a customer or someone else and in the course of negotiations about it expresses a willingness to compromise by accepting less than the full amount of his claim, may that willingness be used against him if the negotiations fail and the matter is finally brought before the courts?

The Supreme Court of Washington says not.

"An offer to compromise is not an admission of the invalidity of a claim," says that court in a recent decision. "Compromises are favored in the law, and the parties to a controversy who in good faith endeavor to adjust the same should not be penalized by having their praiseworthy efforts later used against them to their detriment."

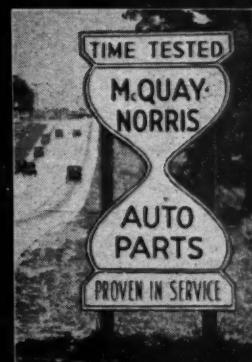
Some repairmen conduct all such negotiations and make all compromise proposals under the specific condition of "without prejudice." Those two words mean, in substance, that the compromise offers cannot be used against the offeror in subsequent litigation.

and McQUAY-NORRIS makes **4 types!**

Steel oil ring,
vertical spacer,
no expander

Steel oil ring

McQuay-Norris Altinized Engineered Piston Ring Sets are not like ordinary ring sets in which the same designs and types of rings are *supposed* to work in all cars. They are not the same old rings with a different label.



JANORRIS MANUFACTURING CO.
Piston Ring Headquarters

EQUIPPED FOR THE FUTURE

(Continued from page 23)

Looking over the Davis Buick super service layout there are many important highlights. Service manager's office is right up front, modern, business-like and free of the miscellaneous things that accumulate in the average service office. Behind his office and along the wall nearest the entrance, is a series of service inspectors who meet customers, analyze trouble, take orders, promise deliveries and follow-through.

Outstanding in this new plan at

Davis Buick is the customers' waiting room, designed like a hotel lounge and flanked with selling suggestions on new accessories and supplies.

On the service floor, every department is a self-contained unit, combining equipment, tools and necessary parts all in one glistening, white enameled display cabinet. Having the right tools and needed parts on the spot saves time, eliminates delay and customer dissatisfaction. Every unit is kept clean and tools, and parts

stock in ship shape. Monday morning inspections, before the shop opens, provides a regular check-up on such things.

A major oil company recently conducted a technical motor clinic, attended by 250 executives, dealers and service managers from the Philadelphia area.

There are eleven quick service departments on the first floor. All are well identified and lighted with modern fluorescent lighting. These include: Lubrication (7000 jobs in 1940); new car inspection; brake service; engine service, such as valve and carbon, spark plug and fan belt replacements; carburetor service; motor tune-up; front end and wheel alignment; and a modern chassis dynamometer; radio and accessories shop; electrical department and a complete tire service and replacement unit.

Washing and polishing are the only quick services handled on the second floor. Three booths are devoted to this work. All major service operations are performed on the upper service floor, including engine overhauling, transmission and differential work, metal work on bodies and fenders, and spray painting.

Why should a successful service operator spend more money on equipment and modernization? The answer can probably be found in these changing times. National defense needs will undoubtedly make heavier demands on our industry. Severe curtailment of production might seriously affect motor car sales, but the need and the demand for serviceable transportation will go right on!

Certainly the Davis Buick management isn't a group of alarmists—and most certainly their equipment and tooling-up, redesigning and modernization is a sound investment in increased service sales, come what may!

N.A.D.A. Officials On Wide Speaking Tour

L. Clare Cargile, president of N.A.D.A., addressed meetings in Illinois, Michigan, Pennsylvania and New Jersey last month.

At these meetings he discussed the necessity of training mechanics to meet the impending labor shortage as outlined in a training program which is being submitted to dealers.

The same subject was discussed by Walter E. Blanchard, manager of N.A.D.A., at a series of meetings in the South. He spoke at the Louisiana Automobile Dealers Convention in New Orleans, the Arkansas Automobile Dealers Convention in Hot Springs, Ark., and at the Automobile Dealers Association of Alabama, in Mobile, Ala.

Charles W. Bishop, general counsel of N.A.D.A., made a special trip to San Francisco, Cal., and Portland, Ore., to address automobile dealers in those cities.

Exclusive!
only McQUAY-NORRIS
offers DOUBLE PREMIUM
SALES PLANS

"THIS PISTON RESIZER
IS A HONEY AND
IT DIDN'T COST
ME A CENT!"

Free- FINE TOOLS AND OTHER VALUABLE
PREMIUMS with
McQUAY-NORRIS
ALTIMIZED
Engineered Sets

Development of
the World's Largest
Valve Engineering Laboratory



THE RICH VALVE
of Silcrome-X Steels

McQUAY-NORRIS JOBBERS

Wolf's Head Takes Over Enlarged Headquarters

The Wolf's Head Oil Refining Co. announces removal of their main office to a greatly enlarged space in a new and modern building on Seneca Street in Oil City, Pa.

Name Metallurgist

Dr. Tracy C. Jarrett, formerly assistant metallurgist with the American Optical Co., has been appointed chief metallurgist for Koppers Co., American Hammered Piston Ring Division,

Baltimore, Md. He has just moved from his home in Southbridge, Mass., to Baltimore where he took over his new duties on Feb. 10.

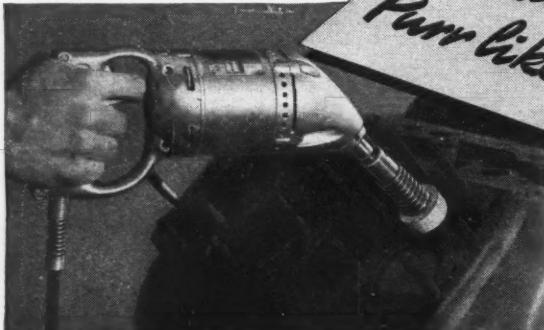
Dr. Jarrett received his bachelor of science degree in metallurgy from South Dakota School of Mines in 1932; his master of science degree from Harvard Engineering School in 1933; and his degree as doctor of science in metallurgy from Harvard in 1936. During 1931 and 1932 he was a laboratory instructor in metallurgy at the South Dakota School of Mines. He also was an instructor in metallurgy at Harvard as assistant to the late Prof. Albert Sauveur.



PENNZOIL CHIEF. John B. Beman, successor to the late Norman S. Day as president of the Pennzoil Co. of California. He brings to the company long experience as its chief counsel.

Snap-on Speedi-centric

FOR ALL VALVE SEATS



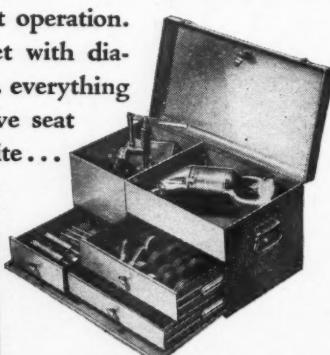
*Make 'em
Purr like a kitten"*

**STONE GRINDING
AT ITS FINEST**

Now, accurate valve grinding is easier than ever before, because an exclusive Speedi-Centric feature — safety locking — lets you lift the stones from the work at *high speed*, avoiding scuffing or over-grinding, permitting that final "feather touch" that gets you a perfect mirror finish... makes valves "purr like kittens."

Full ball-bearing construction, pilots that center accurately regardless of valve guide wear, built-in angle drive, replaceable oilite bearings in stone carriers and stones $\frac{1}{3}$ larger than most stones, are other features that insure better workmanship and lower cost operation.

Speedi-Centric comes complete in cabinet with diamond dresser, stones, carriers, pilots... everything you need for a wide range of expert valve seat service. See your Snap-on salesman, or write...



SNAP-ON TOOLS CORPORATION
Dept. MA-4

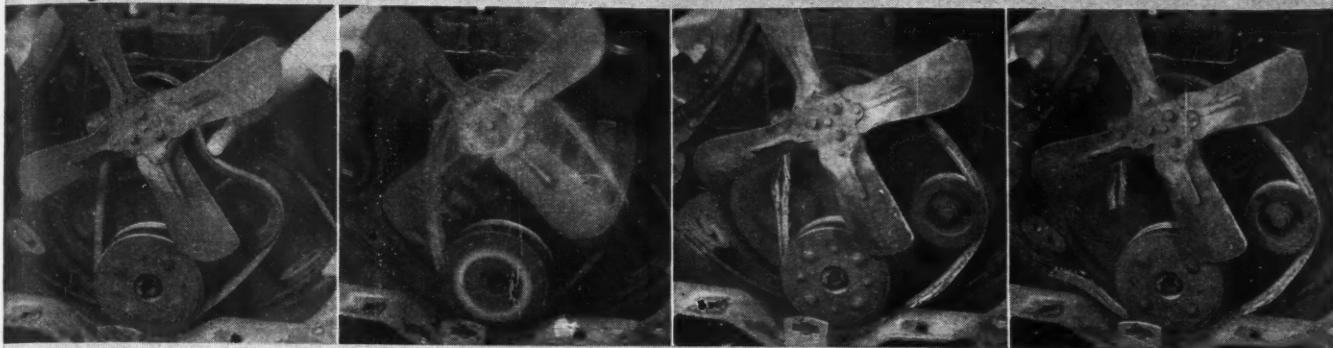
Kenosha, Wisconsin

Snap-on SERVICE TOOLS
The Choice of Better Mechanics

Groce Service Manager

Appointment of G. D. Groce, formerly of Cleveland, Ohio, as general service manager of the Buda Co. at Harvey, Ill., was announced by R. K. Mangan, executive vice-president. Groce has been connected with the automotive industry in a manufacturing and engineering capacity for many years, and during the past 10 years was service manager of the Cleveland Tractor Co.

If IT'S AN ORDINARY FAN BELT . . . HERE'S WHAT TO EXPECT



First it STRETCHES . . . Then it SLIPS . . . Then it WEARS . . . Then it FAILS

But . . . this is a Horse of a DIFFERENT COLOR

It's a Fact!

1500 pounds of horse couldn't permanently stretch this Thermoid Thermodized Pre-Stretched Fan Belt. Taken out of service in a car, just for this test, the fan belt was re-installed and required absolutely no change in adjustment.



Thermoid Thermodized Pre-Stretched Fan Belts stop trouble before it starts. They eliminate the serious problem of fan belt stretch . . . assure satisfied customers. You will make more money selling Thermoid Fan Belts.

THERMOID COMPANY
TRENTON • NEW JERSEY



Thermoid
Thermodized
PRE-STRETCHED
FAN BELTS

New Service Program Launched by Plymouth

Development of a new, more comprehensive program of service to Chrysler Corp. dealers throughout the U. S., in relation to their low-priced car merchandising activities, was launched during the last week in March at a three-day conference of the Plymouth field organization with factory officials, according to J. E. Bayne, Plymouth's general sales manager.

"This new program is an acknowledgment of the vital public service

now being performed by dealers and salesmen in supplying the nation's transportation needs," Bayne announced. "Plymouth's continuing growth among the leaders of the automotive industry also makes it desirable to organize our work in the field on a basis that will be of increasing value to our dealers, while assisting them to be even more helpful to the car-buying public.

"For this purpose, Plymouth's entire field force was called to Detroit for a discussion of important new programs which should have far-reaching effects upon the merchants

and retail salesmen who sell Plymouth automobiles in more than 7800 communities in all parts of the United States.

"Subjects at this field meeting included the introduction of a new educational program which soon will be presented to our dealers, their retail salesmen and salesmen by the Plymouth representatives in the field. This new training program is of a type entirely new to the automobile industry. It represents another long forward step in proper presentation of the product to the public—now recognized as just as important a service to car buyers as improvements in the product itself.

"As a parallel to the new sales training program, a new advertising program expected to result in greatly increased newspaper advertising of Plymouth was another subject about which our men were informed at the conference this week."

The three-day meeting of field representatives with Plymouth factory officials was held at the Whittier Hotel, Detroit. Besides Bayne, who presided over the sessions, factory officials at the conference included W. W. Romaine, director of advertising, and R. C. Somerville, director of regions.



LINK-BELT ROLLER BEARINGS Cost Less Because They Last Longer!



Most brands of bearings are made of good metals—most are manufactured skillfully—but only one brand has the convex-concave roller principle which compensates for wear and adds many extra miles of smooth, dependable performance. The bearings that have this important design feature are Link-Belt Shafer Roller Bearings. Your jobber can tell you all about them and explain in detail why they are tops in performance amongst all replacement bearings for front wheels, differentials and rear axles. Ask for Link-Belt Shafer Roller Bearings.

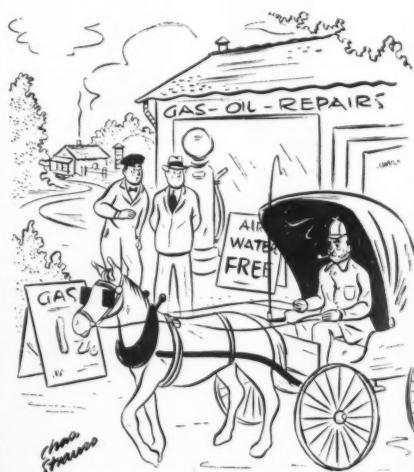
8506

LINK-BELT COMPANY

519 N. Holmes Ave., Indianapolis, Indiana
Warehouses in all principal trading centers
Made by the makers of the famous
Silverstreak Silent Timing Chain!

**LINK-BELT
SHAFER
ROLLER BEARINGS**

FOR
FRONT WHEELS
DIFFERENTIALS
AND
REAR AXLES



"It isn't enough for him to come in every day just to water his horse—he always has to make some crack about the auto being just a passing fad!"



J. L. KOUBEK

Koubek Becomes Guide Lamp Sales Manager

Appointment of J. L. Koubek as sales manager of the Guide Lamp Division of General Motors Corp., Anderson, Ind., has been announced by F. L. Burke, general manager. At the same time Burke also announced the appointment of two assistants, John Hughel and S. R. Conwell.

Koubek has been with General Motors Corp. since 1929, and for the past several years has been with the Guide Division's sales engineering staff. For the past two years he has been in charge of the Detroit office of Guide.

Both Hughel and Conwell have been with General Motors for many years, and Hughel returns to Guide in his new position after being with the AC division for the last six years.

Coincident with the appointments was the announcement by Burke that Hughel would be in charge of the sales office at the main plant of Guide in Anderson, Ind., and Conwell would be transferred from Anderson to Detroit to take charge of the Detroit sales office.

Kiely Sales Manager

The American Bosch Corp. has announced the appointment of Thomas J. Kiely as sales manager, Aviation Division.

Kiely has been associated with American Bosch since 1923, for most of this period in the engineering department, where he has been closely connected with the development and application of aviation magnetos.

DeVilbiss Names V-Presidents

The election of two new vice-presidents, along with a report to shareholders of increased sales during 1940 and a satisfactory corporate condition

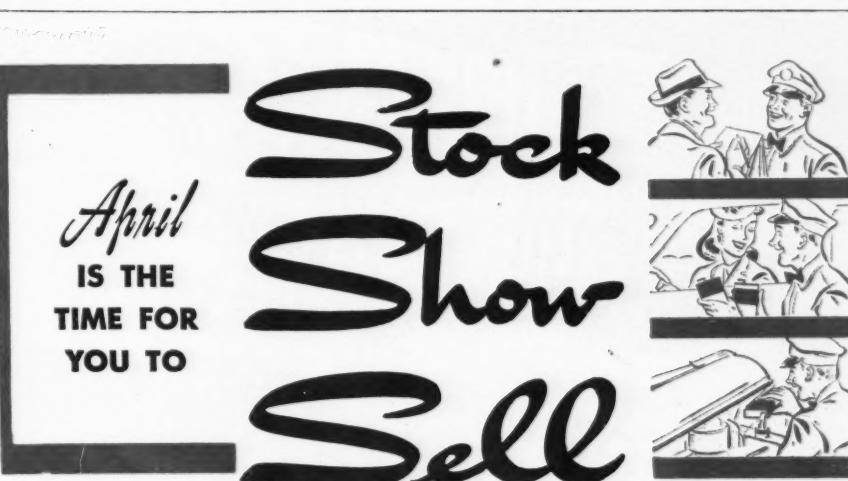
at the close of that year, were the items of major interest disclosed at the annual meeting of the DeVilbiss Co. held in Toledo, O.

The new vice-presidents are Howard P. DeVilbiss and Roy A. Guyer. DeVilbiss is the son of the late Thomas A. DeVilbiss, who conceived and developed the company's industrial division. He has been active in the company since his father's death in 1928.

Guyer, sales manager of the Spray Painting division, has been with the DeVilbiss Co. for 29 years—practically from the very inception of its industrial division.

Ethyl Personnel Changes

Three changes in sales department personnel are announced by the Ethyl Gasoline Corp. Joseph A. Costello, Atlanta division manager since 1937, has been appointed manager of the corporation's New York division succeeding Richard C. Murphy, who was recently named Western Regional Manager. Alan C. Tully, formerly assistant manager of the Dayton division, will replace Costello as Atlanta division manager. Sidney T. Pruitt has been appointed assistant manager at Dayton. All appointments are effective immediately.



FOR "AFTER-ANTI-FREEZE" SERVICE

**How to Make Simple Selling Demonstrations...
Quickly... PROFITABLY!**

You can actually show your customers quickly just what happens inside the cooling system—and prove your selling story!

You can use a quick, convincing demonstration on each Warner-Patterson Cooling System Product... to make faster sales... to open the way for more sales on ALL your cooling system items and service.

April is the time for you to let these Warner-Patterson products bring you more profits!

Ask your supplier for FREE, complete plans on How to Make Selling Demonstrations on Cooling System Service or write to Warner-Patterson Company.

THOROUGH CLEANING Clean Out... the oil muck, scale and sludge... that can ruin the cooling efficiency. When the anti-freeze comes out—use Warner Radiator Cleaner... specially prepared, thorough and SAFE for automobile cooling systems!



PERMANENT REPAIRING Stop Leaks... permanently, quickly, SAFELY... in the radiator—or even in a cracked motor block! Sell Warner Liquid Solder, specially engineered to maintain cooling efficiency in Today's automobiles. The standard for more than 20 years!



POSITIVE PROTECTING Protect... cooling efficiency with Warner Cooling System Protector. Prevents rust and corrosion. Keeps cooling system walls clean! Since all water causes rust, every car needs this important protection.



NATIONALLY ADVERTISED

—to your customers. Month after month, Warner-Patterson Cooling System Products are advertised in Collier's... including all "P. S." issues.

NEW FREE DISPLAY

Ask your supplier to tell you how you can get this FREE Demonstrator-Display... telling a quick, selling story on Warner Cooling System Protector.

WARNER-PATTERSON COMPANY

920 South Michigan Avenue

Chicago, Illinois

Replacement Kit Announced

An exchange and rebuilding service, whereby shop men can recondition fuel pumps taken in exchange for new ones, is being offered by the Hygrade Products Co., 35-35 Thirty-fifth St., Long Island City, N. Y. An assortment of six Hygrade Monoflex fuel pumps, covering thirteen popular makes of trucks and cars from 1935 to 1940 inclusive, provides for the replacement angle. An assortment of Contain-All kits, each kit containing all the necessary parts for complete rebuilding, enables the repairman to recondition defective trade-ins during

slack periods. A 16-page manual on the procedure of rebuilding comes free with a special deal which includes both assortments.

Stanley Heavy Duty Sanders

Two new sanding machines for use on wood, metal and concrete are being offered by the Stanley Electric Tool Div. of the Stanley Works, New Britain, Conn. Both units are enclosed in aluminum alloy housings and feature seal type ball bearings and heavy duty nickel steel spiral gears. Both

Emblems

The automobile emblems which are illustrated on page 58, but which have the identification blanked out, are as follows:

1. Haynes; 2. Auburn; 3. La Salle; 4. Peerless; 5. Stutz.

are powered with Universal type motors, available in 115, 125, 150, 220, 230 or 250 voltages. Model 72, equipped with a 7-in. dia. disc, has a speed of 4200 rpm., while Model 92, with a 9-in. dia. disc, operates at 3300 rpm. The units are complete with bevel type flexible pad, 6 abrasive discs, wrenches and rubber covered, three-wire cable.

Flushing By Air Pressure

A new device to permit flushing transmissions and differentials by air pressure has been announced by the D T Quik-Kleen Co., P. O. Box 823, Tulsa, Okla. It consists of a plug to



4 Reasons Why You'll Find Pennzoil Easier To Sell Than To Sell Against!



1 ADVERTISING SUPPORT. Publishers' statistics show Pennzoil is one of America's biggest advertised motor oils. It's advertising of the kind that directs readers to you—sells you and your services.



2 CONTROLLED QUALITY. Controlled from oil well to crankcase, Pennzoil's top quality is uniform everywhere and always the same. Its quality keeps enthusiastic users coming back to you.

*Nationwide surveys conducted by four leading automotive trade papers show dealers rank Pennzoil as the fastest selling brand on the market!

3 DEALER SUPPORT. Point-of-sale signs, displays, seasonal material—everything needed to draw already interested car owners to Pennzoil dealer locations for service—are furnished free.



4 SUCCESSFUL SALES PLANS. Many specialized sales plans are included in Pennzoil's Kontax Plan that's available to every dealer. Each is a complete package that answers a specific sales problem.



The Pennzoil Company, Oil City, Pa.
Please send me complete information on
 Pennzoil Pennzoil Dealer Merchandising Plans.

Name _____

Address _____

City _____ State _____

MA-1

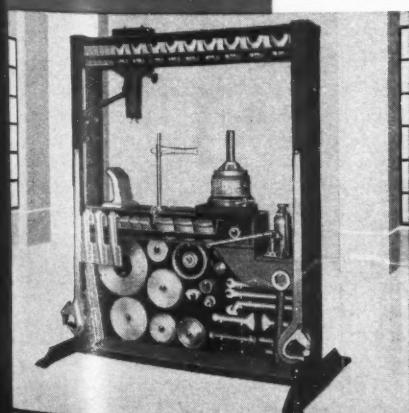
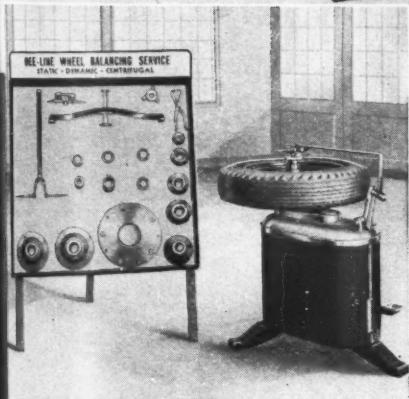
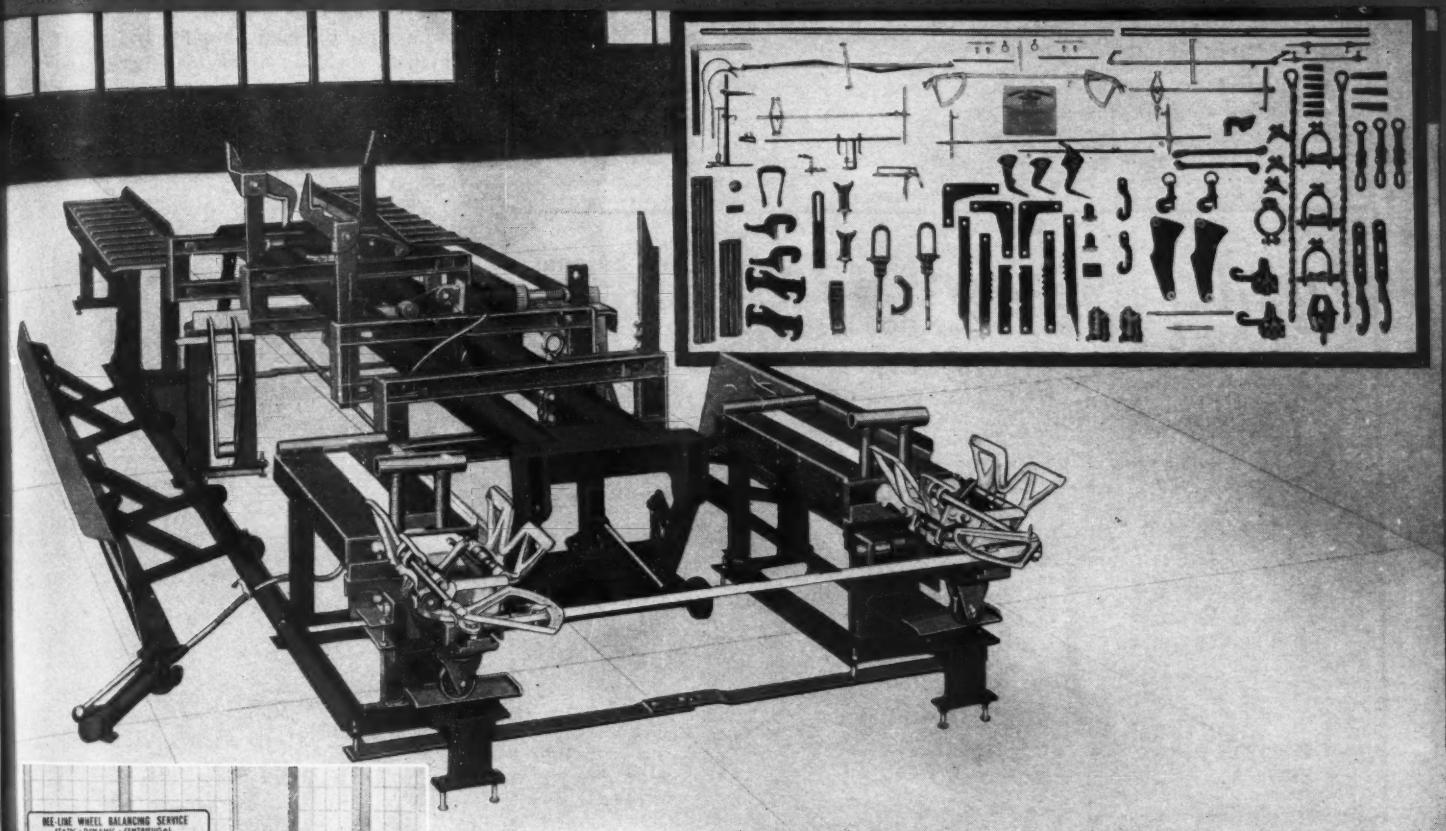
be installed in the top of the unit, with an adaptor to permit connecting the regular shop air line. Opening the drain in the bottom of the unit, and applying air pressure to the adaptor, forces the grease out of the unit. Outfit consists of transmission unit and differential unit, with adaptor. Price \$6.25.



"I don't want any of that quick starting stuff — something's liable to fall off!"

TIME HAS PROVEN

BEE-LINE HAS SO MUCH MORE FOR SO MUCH LESS



BEE-LINE WHEEL BALANCER

The Bee-Line "Static-Dynamic-Centrifugal" Wheel Balancer balances wheels fastly and correctly.

1. CENTER MOUNTING OF WHEELS for separation of static and dynamic forces.
2. FRICTIONLESS STATIC BALANCE, consistently accurate within precision limits.
3. BALANCE METER, a precision instrument which indicates the exact amount and location of dynamic weights.
4. ELIMINATION OF TIME LAG, right or left wheels can be balanced with equal accuracy and can be changed in different positions on car without upsetting original balance.
5. DEPTH GAUGE locates center axis of wheel and true balance is assured with this method.

**Direct-From-Factory
Price—**

\$245.00

BEE-LINE WHEEL, HUB AND BRAKE DRUM STRAIGHTENER

A NEW IMPROVED machine to handle this fast growing service business of straightening wheels, hubs and brake drums.

1. UNIVERSAL HUB and holders for wheels, hubs and brake drums.
2. 20 TON FRAME capacity with built-in tool holders.
3. NEW TYPE adjustable rim tools, designed to service all type wheels.
4. LIGHT BEAM METHOD insures precision measuring operations.
5. ALL SERVICE PARTS made of the finest special grade alloyed materials.
6. NEW LOW PRICE within reach of all dealers.

**A Remarkable Machine
Priced At**

\$375.00

BEE-LINE MASTER MODEL No. 7 CHASSIS ALIGNER

Do not confuse this modern equipment with the old type sliding beam and single runway construction, which design was discontinued in 1934 by our company.

The Bee-Line Improved Tubular Press positively absorbs all load strain so that runways remain in square position at all times, and the sectional type runways permit accessibility to all parts of chassis. These factors are absolutely essential for modern car alignment work.

**Factory-Direct-To-
You Price**

\$1248.00

BEE-LINE "SPECIAL" CHASSIS ALIGNER

Provides a complete service for the checking and correction of all frames and front end systems on all passenger cars and light trucks. This is a machine that prospective buyers would expect to pay from \$1600 to \$1700, but

**Bee-Line's Direct-
From - Factory
Price Is—**

\$1050.00

**Write today for our complete catalog on America's
finest Automotive Alignment Service Equipment.**

BEE-LINE CO.
DAVENPORT • IOWA

L & H Balancing Weight

A new heavy duty wheel balancing weight for trucks has been added to the line manufactured by the Harley C. Loney Co., Detroit, Mich. Designed for use on all truck wheels, the weight is available in five sizes: 1/3, 3%, 1/2, 1 and 1 1/4 lb. It is applied in the same way as a passenger car weight and is easily removed for adjustment.

Wet-Grinder Attachment

The Van Dorn Portable Electric Tool Co., Towson, Md., has a new wet attachment for grinding valve stems

and rocker arms, which can be used on all Van Dorn wet-grinding valve resurfacers. It consists of a two-way valve replacing the resurfacer regulating valve, which diverts the solution to the wet grinding attachment; a regulating valve which controls the amount of fluid applied to the wheel; a special splash guard and return trough to be attached to the outer end of the grinding spindle in place of the regular outer-end guard; a sleeve to protect the shaft and spring of the micrometer attachment, and necessary tubing to carry the solution to the attachment and back to the solution tank.

New Drill by Snap-On

A new, lightweight, electric drill, especially handy in out-of-the-way jobs, is available from the Snap-On Tools Corp., Kenosha, Wis. Powered by aircooled universal type motor operating on A.C. or D.C. current up to 60 cycles, the new unit is equipped with ball and needle roller bearings, as well as helical cut gears, for quiet operation. It is enclosed in an aluminum alloy die cast housing and is furnished with a pistol type grip centered below the weight of the body to give proper balance in operation. Drilling capacity is 1/2 in. in steel and 1 1/4 in. in hard wood. Full load speed is 300 r.p.m.



*Built
as you want
them:* Not of wood—to become wobbly, splintery, oil-soaked wrecks—but of STEEL, rigid and enduring!

'HALLOWELL' STEEL WORK-BENCHES

3 BIG ADVANTAGES TO REPAIR SHOPS

1 SMOOTH WORKING SURFACE . . .

Smooth steel; laminated wood; linoleum or masonite tops—depending upon character of work.

2 PERMANENT RIGIDITY

insured by heavy flanged steel leg construction.

3 EASY MOVABILITY

permitted by standardized construction providing interchangeability of Bench Legs, Tops, etc., facilitating assembly and rearrangement of equipment.



Pat'd and Pat's Pending
Fig. 732
Drawer is extra.

There are 1367 "Hallowell" Bench models and combinations. Order from our catalog sent free on request.

"HALLOWELL" STEEL TOOL STANDS

• Safety for Tools •

This handy "Hallowell" stand rolls right to the job, keeps tools convenient, in order . . . and safely under lock and key! Such a combination saves steps, time and money. The smooth, steel top is suitable for many different purposes, too. It's inexpensive, soon pays for itself. Write for details, prices, and ask about other models.

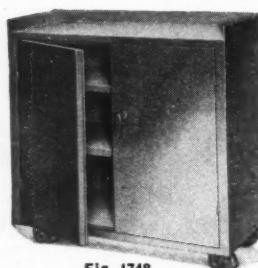


Fig. 1748

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 561

BRANCHES — BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO

Cooling System Chemicals

The Commercial Solvents Corp., 17 E. 42nd St., New York City, has announced a complete line of cooling system chemicals. They are offered under the brand name "Nor'way," and consist of Cleaner, Quick Flush, Stop Leak and Anti-Rust.

The Cleaner is said to remove rust, grease and scale without reverse flushing; the Quick Flush cleans the cooling system while the car is in service; the Anti-Rust protects all metals, including aluminum, from rust and corrosion; and the Stop Leak is designed to seal leaks throughout the system.

Magnus Cold Cleaner

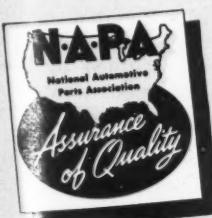
A cold tank cleaner known as Magnus No. 782, designed for the removal of fuel residues from carburetors and fuel pumps, is being offered by the Magnus Chemical Co., Inc., Garwood, N. J. The parts to be cleaned are immersed in the compound for approximately 15 minutes. Brushing, rinsing and blowing off with compressed air complete the operation. A 3 1/2 gal. parts cleaning outfit, consisting of a dipping tank and perforated dipping basket, is being offered free with the initial purchase of a case of six 1 gal. cans of Magnus No. 782.

Where, except in "Allied" can you find a motor parts line whose quality is assured not only by the maker, but also by a nation-wide organization of independent warehousing distributors?

Allied MOTOR PARTS



Make your next motor overhaul an Allied Motor Parts job all the way through! Order them from your nearest NAPA jobber! Compare their workmanship—their accuracy—their performance—with any motor parts you have ever used. Allied Motor Parts welcome comparison! No matter what make or model of car, truck, or tractor, you'll get prompt service—because complete factory stocks of Allied Motor Parts are maintained by 38 NAPA Warehouses to speed the service of NAPA jobbers in every section of the country.



★
Pistons
Piston Pins
Piston Pin Bushings
Piston Pin Set Screws
Piston Pin Lock Rings
Valves
Valve Keys
Valve Guides
Valve Springs
Expansion Plugs
Cylinder Sleeves
Cylinder Sleeve Assemblies

ALLIED MOTOR PARTS COMPANY • DETROIT, MICH.

Pontiac Sales in 60-Day Campaign Exceeds Quota

Pontiac Motor Division's 60-day sales campaign closed March 10 and final returns just compiled show that every one of the company's 24 zones and four regions went over the top on new car sales, according to D. U. Bathrick, general sales manager. Seventeen zones and three regions exceeded quotas for used cars.

"Although we set the quotas so high when the campaign started in January that we thought only a miracle would put us over the top," said Mr.

Bathrick, "we finished with 122 per cent of quota on new cars and 105.5 per cent of quota on used cars for the entire country."

New Sales Help

A new counter merchandiser in the form of an all-steel cabinet has been added to the Stromberg line manufactured by the Bendix Products Div., Bendix Aviation Corp., South Bend, Ind. The cabinet contains a counter stock of repair parts kits, tools and gasket sets. For a limited time the cabinet is furnished free with the purchase of the stock assortment.



H. G. Barnes

Barnes Appointed

The National Battery Co., St. Paul, Minn., has announced the appointment of H. G. Barnes as vice-president and general manager in charge of its Gould Commercial Division, Depew, N. Y.

From 1921 to 1923 Barnes was engaged in industrial engineering. Early in 1924 he organized the Motor Power Equipment Co., distributors of cars, trucks, tractors and equipment, in St. Paul. In 1932 he organized the Industrial Credit Co., also in St. Paul. He served as president of both of these companies until December, 1940, at which time he resigned and took his present position with the National Battery Co.

New Auto Radio Aerial Introduced by Philco

Announcement of a revolutionary new automobile radio aerial, the Philco Duo-Flex Aerial, has been made by Robert F. Herr, manager of parts and service division of Philco.

"For the first time," stated Herr, "Philco has produced an aerial which is adjustable in any direction after the installation has been made."

A specially designed slotted insulator permits the aerial to be shifted toward the front or rear of the car for a vertical position and with a simple additional adjustment at the base of the aerial rod, the aerial can be set in position toward or away from the cowl.

Kester Solder Expands

The Kester Solder Co., whose main plant and general offices are in Chicago, has announced the purchase of the property now occupied by their Newark, N. J., division located at Ferguson and Clover Streets in Newark.

F. C. Engelhart, president of the Kester Solder Co., reports production at the highest level in Kester history and intimates that further expansion and improvements are planned for the Newark plant.

SEND FOR YOUR FREE 4-LEAF CLOVER NOW! GET READY FOR RECORD BUSINESS!



SELL FAMOUS, NATIONALLY
ADVERTISED BEAR
CORRECTION SERVICE

You can prove the need for balancing in thirty seconds by pushing the Bear Wheel Spinner under a wheel on the customer's car. And, with the Bear Dy-Namic Balancer you can show up the unbalanced spots to the customer by electric Neon Eye and prove that the condition is corrected after balancing. You can't afford to use makeshift methods when the well-known Bear Equipment costs so little and you can buy it on the EASY PAYMENT PLAN.

Better get your Bear Spinner and Bear Wheel Balancer and get ready for capacity business! Bear's Big Lucky Clover Program breaks in COLLIER'S and TIME Magazines right away and customers all around you are going to be looking for the shop with the Bear Sign out in front!

NATIONAL ADVERTISING FOR YOUR SHOP

That's an exclusive advantage you get with Bear Equipment. You not only get precision equipment that you're proud to own — that cuts your costs and does a better job — but you get a merchandising program that sends customers right into your shop.

Send for your free Four Leaf Clover today! It's a real, honest-to-goodness Four Leaf Clover. We'll tell you how you can get one for every one of your customers — and use them to build your business.



**FAMOUS RACE DRIVER
and SALT LAKE CITY
MAYOR, AB JENKINS,
SAYS:**

"When I first saw your machine at the Indianapolis Speedway, I was impressed with its precision, surest method of operation. Today, I still think it the greatest thing of its kind and this opinion definitely influenced selecting one of your latest models for our city garage."

Copyright 1941, Bear Mfg. Co.

Be the lucky one!
GO with BEAR in '41!
Write Bear Mfg. Co., Rock Island, Ill., Today!

When writing to advertisers please mention Motor Age

AS I WAS SAYING TO THE BOYS
AROUND THE TREE THE OTHER
NIGHT-COLLIER'S IS THE MAGAZINE
FOR AUTOMOTIVE ADVERTISING.

OH, THERE'S NO QUESTION ABOUT IT,
BUTCH, COLLIER'S P.S.CAMPAIGN FACIL-
ATES THE MERCHANDISING OF A MANU-
FACTURER'S ADVERTISING--WHICH
MEANS MORE SALES FOR DEALER,
DISTRIBUTOR AND MANUFACTURER.



**SMART DEALERS
EVERYWHERE
are cashing in
on Collier's
P.S. Campaign**

If you sell automotive service, you can increase your business and your profit by making use of the tremendous force of the Collier's P.S. Campaign.

To find out how—just write on a post card: "I want to cash in on P.S.—tell me how." Send the post card to Preventive Service, Collier's, 250 Park Avenue, New York City.

Collier's P.S. campaign

COPYRIGHT 1941, THE CROWELL-COLLIER PUBLISHING CO.

18 LUBRICATION JOBS PER 1000 GALLONS OF GAS

Roxborough, Pa. serviceman nearly doubles "average" take on lube sales as measured against gasoline gallonage

LUBRICATION experts say that if a service station can produce 10 lubrication jobs for every thousand gallons of gasoline retailed, it's a lead-pipe cinch that the operator is making money.

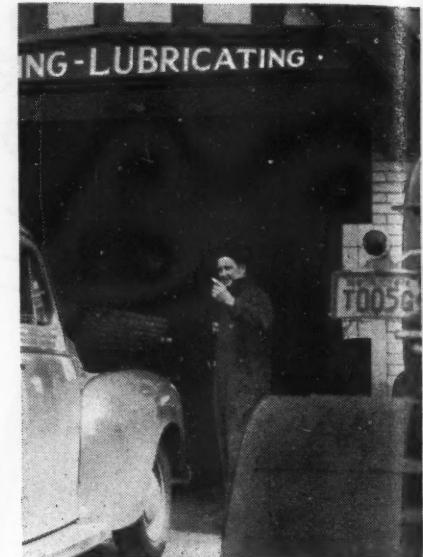
Pumping a thousand gallons of gasoline provides a real opportunity to contact a lot of service prospects, so ten lube jobs per thousand is something worth shooting at.

What goes on, then, at a service

station which sells not 10—but 18 lubrication jobs per thousand gallons of gasoline...and averages 15,000 gallonage a month? Let's see, multiplying that out gives us 270 lube jobs a month—which, to put it mildly, is nice going for G. Frank Katzenbach of Roxborough, Philadelphia, Pa.

Now Katzenbach's service station is no ordinary gas and oil joint—it's a complete service out-

(Continued on page 102)



G. Frank Katzenbach

How the Service Dollar is Spent in Katzenbach's Shop

Gasoline, Oil and Lubrication	....60%
Engine repairs, tune-up, Brake service, labor and parts	....25%
Tires and tubes, Batteries and accessories	.....10%
Washing and polishing, Tire repair, Battery recharging	.....5%
	100%

We are pledged to
NATIONAL SAFETY COUNCIL
STANDARDS
FOR
BRAKE SERVICE
USING
Grey-Rock
ENGINEERING METHOD

UNIVERSAL SAFETY

3½ feet high! In full color! 48 pages!

1941 SERVICE STATION EDITION

BRAKES BALANCED
WE Grey-Rock BALANCED BRAKES

GREY-ROCK ENGINEERS' SERVICING AND RELINING METHODS
COMPONENTS OF
YOUR
GREY-ROCK JOBBER

Our Pledge
In servicing your brakes our mechanics follow the technical methods prescribed by Grey-Rock engineers. Our replacement materials are Grey-Rock's Balanced Brake Linings.

NATIONAL SAFETY COUNCIL'S STANDARD SCHEDULE FOR BALANCING ALL BRAKES

1941 SERVICE STATION EDITION

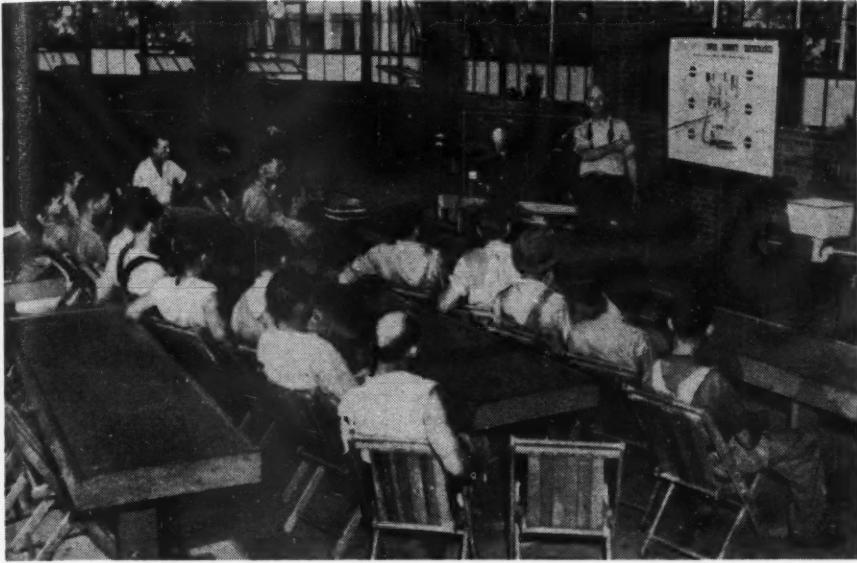
GREY-ROCK ENGINEERS' SERVICING AND RELINING METHODS
COMPONENTS OF
YOUR
GREY-ROCK JOBBER

BRAKES BALANCED WE Grey-Rock BALANCED BRAKES

GREY-ROCK ENGINEERS' SERVICING AND RELINING METHODS
COMPONENTS OF
YOUR
GREY-ROCK JOBBER

Grey-Rock WE GREY-ROCK BALANCED BRAKE LININGS
Gives you National Safety Council's new schedule.

Grey-Rock



By ED WARNER

FACED with a shortage of automobile mechanics in dealer repair shops which may become acute within the next six months, leaders in the industry and the Office of Production Management are taking steps to meet the problem.

William S. Knudsen, director of the OPM, stated the grave urgency of the situation in a recent letter to L. C. Cargile, president of the NADA, when he said, "Automobile dealers in the aggregate are large employers of capable labor. Every dealer should now face squarely the fact that the need for machinists, maintenance and repair men is growing rapidly. Defense plants may soon be expected to make sweeping demands on this skilled labor supply."

"Meantime, completion of cantonments, munitions factories, defense housing and the like places an added load on the country's highway plant. Men and materials, both in industry and the Army, must move

(Continued on page 94)

MORE SCHOOLS FOR AUTO MECHANICS

**OPM, Factories, Dealers
Cooperate in Training Men**

ent
0%
25%
0%
5%
00%

ER HAS THIS NEW WALL CHART

GET IT
GET IT UP
GET IT WORKING FOR YOU

Grey-Rock designed this chart for men who want to do good brake work. It displays your promise to work to National Safety Council's new service schedule. It reprints all the standards. It gives Grey-Rock Engineering Methods for all operations for all cars in easy-to-follow, diagrammatic pages. It will increase business and profits. It helps you cash in on Grey-Rock's advertising to the 50,000,000 audience of SAT. EVE. POST, COLLIER'S, LIFE, and TIME.
Get your copy of this chart from your Grey-Rock Jobber—Free.



BALANCED BRAKES

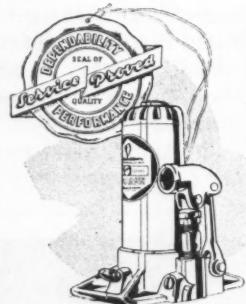
UNITED STATES ASBESTOS DIVISION
of Raybestos-Manhattan, Inc., MANHEIM, PA.
BRAKE LININGS • CLUTCH FACINGS • FANBELTS
AUTOMOTIVE HOSE • RELINING EQUIPMENT

SHOP-SCOUT

Scoops!

Do You Know?

You can lick 90% of all body work, and do hundreds of garage, service station, and car dealer jobs faster, better and more profitably with BANTAM Porto-Power. This new lightweight, hydraulic tool gets in places where big units can't — is priced so low every shop and mechanic can afford the money-making advantages of Porto-Power!



Do You Know?

9 out of 12 Winners of 1940 Bus Maintenance Awards used Blackhawk Hydraulic Jacks! Every year since 1930, when these awards began, Blackhawk Hydraulics have been in the top ranks of the winners — proving the superiority behind the Blackhawk "SERVICE-PROVED" Seal. And only Blackhawk Jacks are tagged with this seal.

Do You Know?

You can handle ignition work and scores of other ticklish jobs faster and easier with slim, trim, lightweight, but extra strong "NUGGIES" of the famous Blackhawk line of wrenches. HEXITE steel — they won't round out. Ask for 18ND Set!

Products of
BLACKHAWK MFG. CO.
Dept. M641 Milwaukee, Wis.



**SEE YOUR
JOBBER SALESMAN**

for all the new features in Blackhawk Socket, Box-Type and Open-End Wrenches — Hand Jacks — Service Jacks — and Porto-Power.

BLACKHAWK

See opposite page for other Blackhawk features

MECHANICS SCHOOLS

(Continued from Page 93)

efficiently. The job of maintaining motor vehicles in use will grow inevitably, at the same time that defense production necessarily has first call on trained labor."

Higher wages in defense industries and the selective service act have been two major reasons for the depletion in the ranks of skilled mechanics. The aircraft industry alone must find 166,000 qualified men by Sept. 1, of whom 41.3 per cent must be fully skilled and 46.5 per cent semi-skilled, according to the Bureau of Labor Statistics of the Dept. of Labor. Likewise, the mechanization and motorization of the U. S. Army have made dealer mechanics particularly valuable as service specialists when drafted.

C. R. Dooley, director of the Training Within Industry program of the OPM, has offered the resources of his organization to dealers confronted with a labor shortage. Information on job analysis and upgrading will be furnished to automobile shops by the program's advisory service. But in the final analysis, Dooley emphasizes that the quickest and most effective way to train men for such work is to provide instruction in the particular job right in the shop.

In meeting this labor problem, the NADA points out that the employer first should determine how many men he will need. The draft status of each mechanic should be investigated, the probable increase in business during the next several years due to national defense spending should be analyzed, the competition for labor in the particular community should be studied and the total number of men that need to be trained should be determined. Repair service business is likely to increase if the defense program should force any curtailment in new car production, thus placing a greater responsibility upon the automobile repair shop.

Several methods are suggested for obtaining sufficient manpower if a shortage develops in a particular community. The employer can survey the men in his shop, select those who are not doing mechanics' work but are capable of doing it and then train them for the more skilled jobs. This is called upgrading. The positions which are left by those upgraded are easier to fill. Or the employer can rehire men who formerly worked in the shop but left because of age, minor physical disability or other reasons. Men who once were deemed too old in such a competitive field as automobile mechanics are again finding employment after a short period of refresher training on the newer automotive developments.

But the important point for employers to remember in the present defense emergency is the fact that when the need for mechanics develops there will be no reservoir of unemployed mechanics on which to call. They will all have been absorbed by defense industry if they have not already obtained shop jobs.

There are a number of ways to train mechanics. The most common is training on the job, in which an experienced mechanic takes the trainee in hand and serves as his instructor. Of course, trainees must be paid during their period of instruction and the instructor also may take more time from his normal duties, but this is the only way of insuring an adequate staff. Under this method it is easier to train men in a few specialized operations than endeavor to make them all-around general mechanics in a short time.

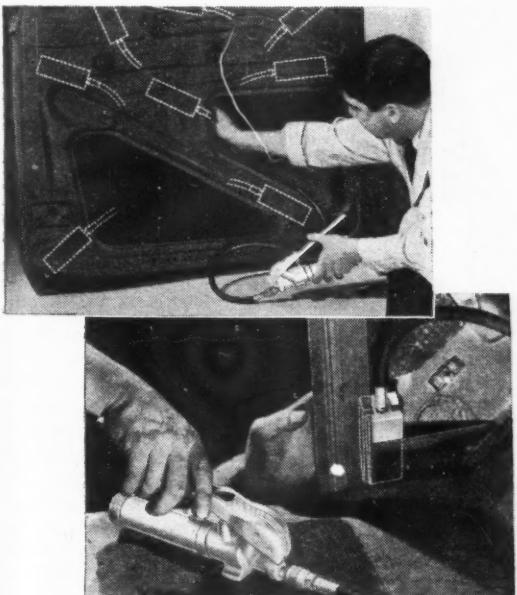
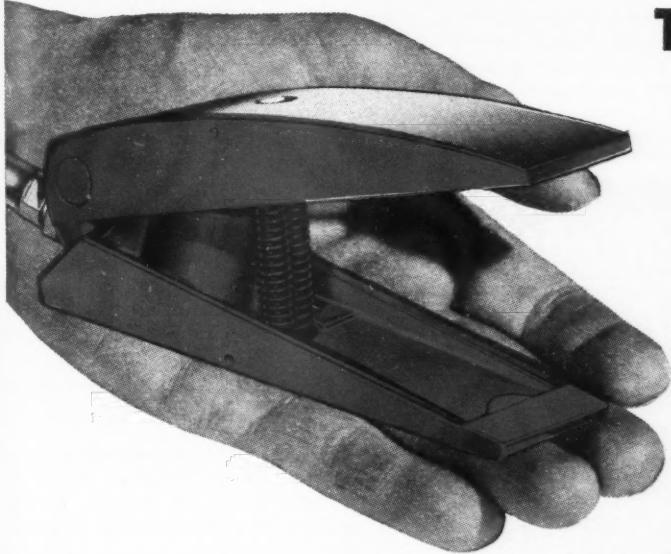
In the larger shops, it is probably more practical to have certain competent men serve as instructors, with the responsibility of breaking in the new men. These men should be released from their regular service work and devote all their time to training. Many of the manufacturers provide training material for this purpose. Some localities may establish training groups to instruct new men from a number of shops.

(Continued on page 96)

**ANOTHER
Porto-Power SCOOP!**

"Wedgie"

THE MIRACLE TOOL

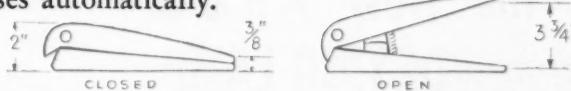


Wedgie "works in the dark" — is the first practical tool for profitable "inside work" on doors and body panels.

Hydraulic Wedge so small it fits your hand . . . Enables you to spread, straighten, dolly INSIDE Panels, Doors, Cowls and other Tight Spots.

Here's one of the greatest time and trouble-saving tools ever offered for automotive service. "Wedgie" is a combination dolly and spreader with a hydraulic ram *built right inside* the jaws.

Only 2" wide, $6\frac{1}{2}$ " long and 2" high at its largest point, "Wedgie" works miracles INSIDE doors, around roof rails, fender walls, body panels and around the motor for moving accessories and making installations. When closed, "Wedgie" is only $\frac{3}{8}$ " at tip — opens to $3\frac{3}{4}$ " — closes automatically.



SA-3 is a complete self-contained unit ("Wedgie", 4-foot hose and scissor-action pump) while the SA-4 "Wedgie" has Spee-D-Coupler for use with your standard Porto-Power (not Bantam).

Whether you're a car dealer, body man, garage or service station operator, "Wedgie" will turn in real profits for you on a lot of jobs you've never been able to handle before. Ask your jobber salesman to show you the miracle-working "Wedgie". Its cost is attractively low.

A Product of **BLACKHAWK MFG. COMPANY**
DEPARTMENT P641 • MILWAUKEE, WISCONSIN



BLACKHAWK

SEE OPPOSITE PAGE FOR OTHER BLACKHAWK FEATURES

SCHOOLS

(Continued from page 94)

There also are local schools and government agencies that will cooperate with shops in furnishing partially trained men for mechanics' jobs. The Vocational-Education program of the National Defense Commission is functioning through state boards of education and state employment agencies in conducting pre-employment courses for mechanics. The Vocational-Educational program also provides specialized supplementary

training in such skills as welding, electrical and sheet metal work.

Under the National Youth Administration, young men from 18 to 25 receive training in mechanics' courses for which they receive nominal wages for working 60 hours a month. Arrangements can be made to have these youths come into the shops on a part-time basis and give them practical experience, paying them while they learn. The WPA and the state employment services are other sources of prospective trainees.

The motor car manufacturers also have anticipated the shortage of me-

chanics and have taken steps to aid their dealers in maintaining adequate service staffs. Chevrolet saw the situation developing last summer and stepped up its service school activities in 45 zones in order that its 8600 dealers might have enough mechanics. This is merely an expansion of the usual service school program under which mechanics are given detail instruction on the latest mechanical developments in the new models every year. Experienced men from zone headquarters conduct short five-day courses. At present there is an emphasis on training of youngsters, high school graduates under 21 who are not subject to the draft. The shortage of mechanics has been felt most at points like Davenport, Iowa, where there has been a 35 per cent turnover due to lucrative jobs in the nearby Rock Island (Ill.) Arsenal. At Hartford, Conn., mechanics have been scarce due to the large aircraft engine plant there which has been expanding continually. The same situation exists at Los Angeles, Cleveland, Indianapolis and other centers of defense industry.

Ford Motor Co. conducts classes for mechanics, sent by dealers, under the supervision of its 34 branch service managers. This continuing program has been used chiefly to acquaint the men with new model changes but it also can be utilized to train new men due to shortages in man-power. Week-long schools are held regularly at the branches, with four days devoted to dealer mechanics and one day to fleet mechanics. Field service men can be dispatched to any center where an acute shortage develops in order to hold a concentrated training course.

Pontiac Motor Division is establishing schools for the training of mechanics in each of its 23 zones. Addressing a recent meeting of dealers, D. U. Bathrick, general sales manager, said, "We expect to have mechanic schools soon in operation in the zones timed to become most effective as conscription goes into high gear late this spring and summer. These schools will draw upon youths with special mechanical aptitudes who are not of draft age or exempt because of dependents. These prospective mechanics, when trained by us, should be of increasing value to you as dealers and to the national defense effort when needed."

Chrysler Corp. sponsors mechanics' schools conducted by its service representatives and also cooperates with local trade schools in obtaining training prospects.

Local dealer associations also are proving helpful in meeting any shortages that develop. The Detroit Auto Dealers Association for a number of years has cooperated with the Wilbur Wright High School, a ranking city vocational institution, in developing potential mechanics. Specialized courses are given in sheet metal work

(Continued on page 101)

NOW-Spot Work Takes 8 Minutes ...Instead of All Day!

6 BULBS INSTEAD OF THE USUAL 4... MEANS 50% GREATER DRYING AREA

SEALED BEAM BULBS STAY CLEAN... GIVE MORE HEAT... LAST 10 TIMES LONGER

With the New ARCO INFRA-RED DRYING LAMP and ARCO SYNITE

Here's a drying lamp that really dries... with a speed unknown before. Here's why—6 BULBS instead of the usual 4; SEALED-BEAM BULBS instead of old-fashioned carbon lamps and reflectors; TUNGSTEN FILAMENTS that last from 5,000 to 50,000 hours (most manufacturers of old style bulbs claim 300 to 500 hours).

FOR BEST RESULTS: ARCO SYNITE

ARCO SYNITE has been specially formulated for forced as well as air drying. When used with the ARCO DRYING LAMP it gives far better results than most ordinary air-drying enamels. No wrinkling. No sagging. No tackiness. And the job is dry in minutes... instead of hours.

Address Dept. M-4

THE ARCO COMPANY
Cleveland, Ohio • Los Angeles, Cal.

ARCO SYNITE
(SYNTHETIC ENAMEL)

NO CLEANING OR REPLACING OF REFLECTORS

No dirt or spray dust can cut down the effectiveness of ARCO SEALED-BEAM Bulbs.

The Arco Synite Color Machine is the greatest time and money saver on the market!



CASH IN on this AC Oil Filter ADVERTISING—Appearing NOW

HERE'S HOW

to do it

- Wipe every dip stick on an AC Oil Test Pad

- Show the oil spot on the pad to the customer

- Put the special advertising in your windows

- Display your AC Oil Filter Station Sign prominently

REMEMBER—a dirty oil spot on the AC Test Pad means a chance to sell an oil change, and either a filter renewal or a filter installation.



NEW

METAL WEATHER-PROOF DISPENSER
for AC Oil Test Pads
—FREE to AC Oil Filter Service Stations



THE SATURDAY EVENING POST

SEE THAT IT'S CLEAN, TOO!
—When Your Oil is CHECKED

NOW — at official AC Oil Filter Service Stations everywhere—you can get this modern kind of oil check, at no cost to you. You can **See for Yourself** how clean your oil is. Ask for this service.

HERE'S HOW YOU TELL

Oil that looks like this
On the AC Oil Test Pad—is clean oil. It will not log piston rings and oil passages.

Oil that looks like this
Means one of three things—
1. Your oil needs changing.
2. Your oil filter element should be replaced.
3. You need an oil filter.

Wherever You See THIS SIGN
You'll get an instant oil check on your oil. This sign identifies the AC Oil Filter Service Stations everywhere.

NOTE: Many kinds and grades of oil are in use today. You will be sure of the best results if you have your oil checked periodically. If your oil is dirty, it may be time to change more often or to whom or what should be changed.

AC OIL FILTERS
Get the Dirt

Sludge and dirt accumulate in engine oil in a few thousand miles of driving. If not removed, they clog the all-important oil slots in piston rings. This causes loss of engine compression. Then—
up go oil and gas consumption and carbon formation, and down go car performance and economy.

AC Oil Filters remove sludge, dirt, dust, and discoloration from the oil. In a short time, they pay for themselves.

A Size for Every Engine

Use one AC Oil Filter for YOUR engine—right size, right price. Your neighbors' local AC Oil Filter Service Station can install any size and model in a few minutes.

AC SPARK PLUG DIVISION • General Motors Corporation • FLINT, MICHIGAN

Install an AC OIL FILTER—Today! SAVE ENGINE WEAR—SAVE MONEY

This advertisement appears in the Saturday Evening Post, Collier's and Country Gentleman

REGISTERED STATIONS are tied in with this Advertising,
and receive Window Trims, Test Pads, and Dispenser FREE

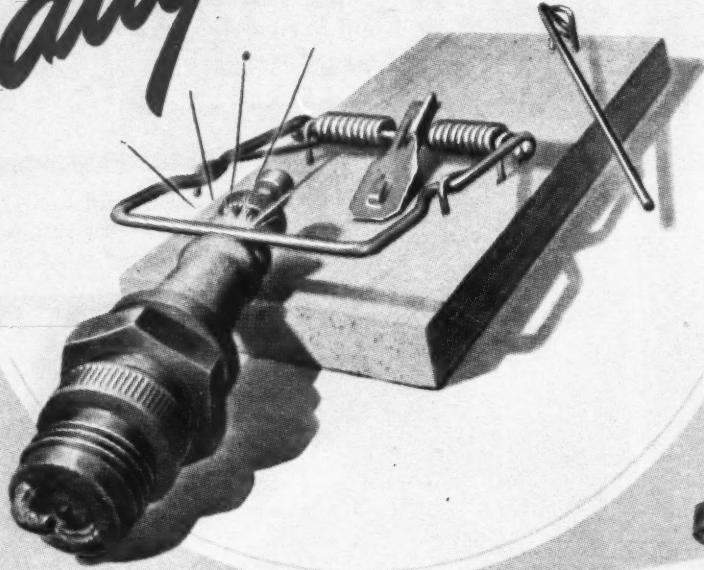
Register NOW and Increase YOUR SALES and PROFITS
SEE YOUR AC WHOLESALER'S SALESMAN



Coming in MAY

THE SATURDAY EVENING POST

Caught!



This "Dirty RAT" was Stealing Gas!



Sparks on insulators, so
plugs may look like this

Get Plugs
CLEANED.
where you see
THIS SIGN



AC's are Standard Factory Equipment on more cars and trucks than any other make of spark plugs

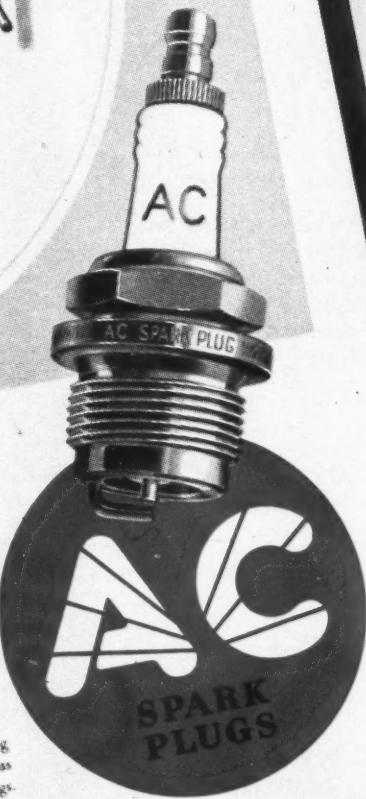
Dirty or worn spark plugs steal as much
gas as one gallon in ten. Have your plugs
checked, cleaned, and regapped. Replace
those that are worn. Be sure of better
performance and mileage.

For More Than 32 Years
THE QUALITY SPARK PLUG

It is a matter of record that nearly every spark plug
improvement which has stood the test of time was
developed, and introduced, in AC Quality Spark Plugs.

AC SPARK PLUG DIVISION, General Motors Corporation

FLINT, MICHIGAN



Here's what AC Magazine Advertising
WILL TELL YOUR CUSTOMERS

NEWSPAPERS WILL TELL THE SAME STORY
6 weeks' campaign—in the 122 leading papers in the country

SCHOOLS

(Continued from page 96)

for bumper and collision men, engines and brakes. At present there is a shortage of boys in the first named category due to the need for sheet metal workers in Detroit aircraft plants. The Detroit association is planning a six-month compulsory course for prospective mechanics 18 years old and up, the trainees being selected on the basis of mechanical aptitude tests which weed out the unfit applicants.

The Automotive Trade Association Managers has appointed a committee on the training of dealer mechanics in order to pool the experience of various dealer associations in this work. R. Earl Burrows, of the Cleveland association, is chairman, with Paul T. Graves, of Detroit, and J. A. Schlecht, of St. Louis, as other members.

Only by development of an adequate training program for mechanics will it be possible to keep the 31,468,000 motor cars and trucks of the U. S. in running order.

Chilean Newspaperman Visits Chevrolet Plant

Rafael Valdivieso, young Chilean newspaperman serving as an exchange correspondent for his paper, *El Imparcial*, of Santiago, Chile, and a member of the staff of the *Detroit News* for two months, has just completed a three-day assignment by visiting the Chevrolet division of General Motors in Detroit and Flint.

Valdivieso, now only 23, is the youngest of seven correspondents from Chile now in this country at the suggestion of the United States Am-

bassador to Chile, Claude G. Bowers, to promote good will between the two countries. His colleagues are working on papers in New York, Washington, Philadelphia, Boston, and Los Angeles.

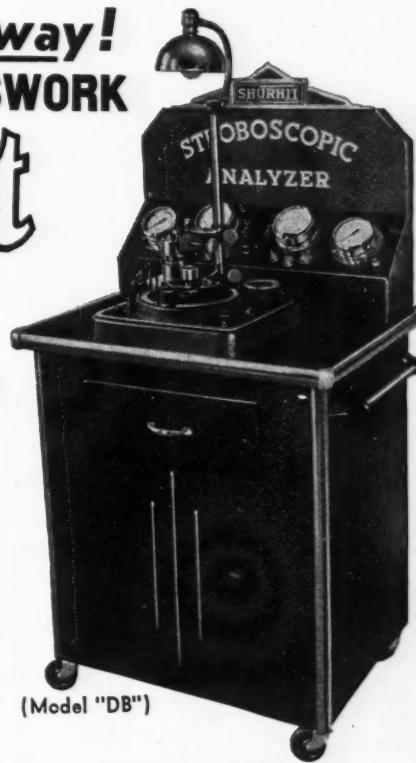
During his visit to Chevrolet, Valdivieso met William E. Holler, general sales manager and spent one afternoon attending a session of the Post-Graduate School of Modern Merchandising and Management, which was founded by Holler for the training of sons of Chevrolet dealers. He was greatly impressed by the thor-

oughness and scope of the training given these young men and has written his impressions of this unusual aspect of the automobile industry for his home paper in South America.

Perfect Circle Dividend

The directors of The Perfect Circle Co., Hagerstown, Ind., declared the regular quarterly dividend of 40c. per share on the 162,500 shares of outstanding capital stock of the company on March 10. The dividend is payable April 1, 1941, to stock of record at the close of business March 21, 1941.

Cash-in on tune-up work the sure easy way! ELIMINATE GUESSWORK BY USING A *Shurhit* STROBOSCOPIC ANALYZER



(Model "DB")

ONLY \$11.00
a month

The Shurhit Stroboscopic Analyzer accurately discloses the true condition of the distributor, as well as the coil and condenser, if the coil on the car is used. It also shows presence of worn bearings, worn shaft, or both; rough cam, uneven cam, weak contact springs, poor condition of contacts, improper spacing of contacts, as well as the performance of the coil and vacuum spark modifier in coordination with governor advance. This equipment enables you to detect trouble, make corrections, check your work and profitably merchandise tune-up service. It also helps sell ignition parts—thus shoving you double profits.

Make Big Profits on Small Investment in

SHURHIT IGNITION PARTS



Ask your Shurhit jobber or write us for details on General Ignition Assortments of fast-moving parts . . . Contact Points . . . Condensers . . . Rotors . . . Caps . . . Coils . . . Switches, etc.

SHURHIT PRODUCTS, Inc.

Waukegan, Illinois

Send details on Model "DB."
 Also send details on General Ignition Assortments.

SIGNED

FIRM NAME

ADDRESS

CITY .. . STATE ..

NAME OF JOBBER ..



"Errr . . . you've got cold hands!"

4-Leaf Clovers Feature Safety Drive by Bear

Genuine four leaf clovers given away free to drive home to America's car owners the fact that the lucky driver is the one whose car is safety tested, national Bear dealer advertising in *Time* and *Collier's* magazines to carry the story to the customers and prospects of Bear dealers, direct mail and newspaper advertising for Bear dealers to use in their own trading area to enable Bear dealers to offer free four leaf clovers locally and to cash in on their national advertising, these are the ingredients

of the unique and comprehensive advertising program yet developed by the Bear Mfg. Co., Rock Island, Ill.

"More than ever America needs the type of safety test and correction service provided by Bear equipment," states Will Dammann, president of the Bear Manufacturing Co. "The national defense program requires the conservation of America's resources, the elimination of the appalling automobile accident waste, the increased efficiency of America's highway transportation facilities, and the elimination of unnecessary wear and obsolescence."

"The time is, therefore, particu-

larly opportune for a program of consumer education on the importance of Safety Test and Correction Service to safety and economy of automobile operation. As the leading manufacturer of this type of equipment, we feel that it is our duty and privilege to continue and strengthen the program which we began last year in the national magazines."

Ackerman to Direct Dodge Merchandising

Appointment of J. R. Ackerman as director of merchandising and advertising, Dodge Division, Chrysler Corp., is announced by E. J. Poag, assistant general sales manager. Ackerman has been associated with Dodge for several years, formerly as a field manager and, until his present appointment, as assistant director of truck merchandising at the factory in Detroit.



J. R. Ackerman

Ackerman has been engaged in the automobile business almost continuously for a period of more than 20 years. He has had production experience and is familiar with virtually every phase of motor vehicle distribution.

LUBRICATION

(Continued from page 92)

let using the gasoline pump and lubrication department as a means to establish constant consumer contacts—to sell engine repairs, brake service, tune-up, tires and batteries, parts and accessories.

The station is well-designed with gasoline islands, lubrication and service entrances easily accessible. The shop is well equipped with modern tools and shop equipment, parts and accessory displays.

Lubrication business "just growed" for Katzenbach. Doing the fundamental things and doing them right is the only secret the service operator gives for his higher-than-average lubrication score. Katzenbach insists on maintaining his prices and hasn't used bargain or cut-prices to stimulate lube sales.

Knowing how to do a complete and thorough lubrication job is his first fundamental; the second is proper equipment and materials of known quality; the third is expert help; and the fourth is an unconditional guarantee of customer satisfaction. These are the four fundamentals followed religiously on every lubrication job in Katzenbach's service station and it's his explanation of how to sell 18 lubrication jobs for every thousand gallons of gasoline.

**AMERICA'S
BEST
MECHANICS**

Select
P&D PRODUCTS

**TO HELP
YOU
SELL**

With each P. & D. Assortment you get a cabinet, a 3-color metal sign, a tune-up chart, catalogs and a catalog binder and all other sales helps as fast as issued.

P. & D. Cabinet assortments range from DA - 21 at \$31.79 to DA - 90 at \$103.62 (flasher sign supplied free with this model).

P. & D. MANUFACTURING COMPANY, Inc.

STARTING LIGHTING IGNITION REPLACEMENT PARTS

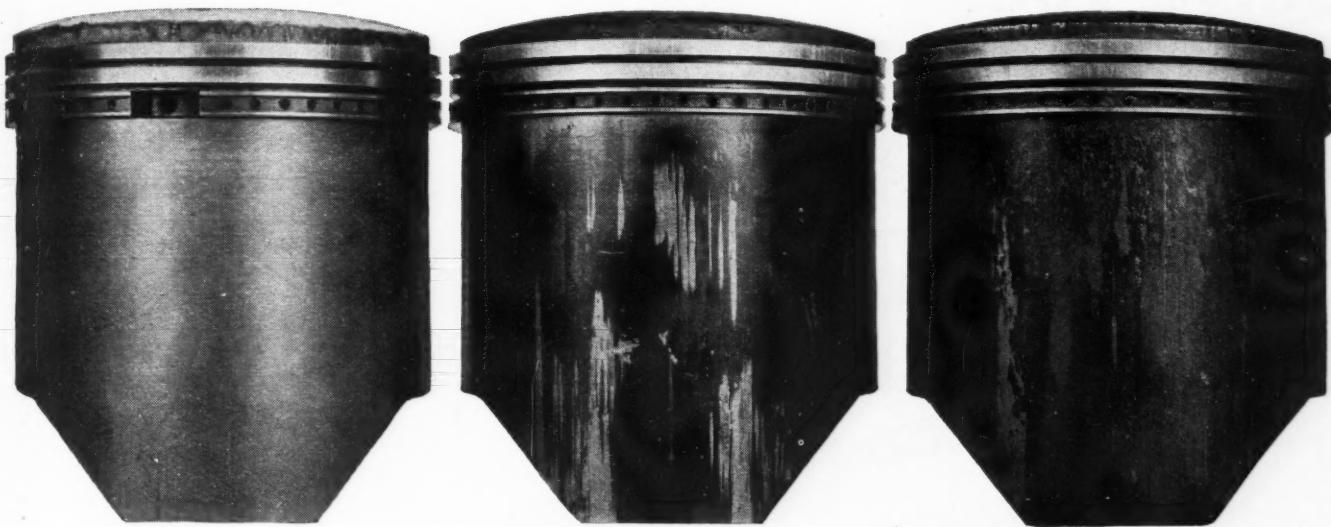
LONG ISLAND CITY NEW YORK

P. & D. Manufactures ONE complete quality line. Only the finest materials and workmanship obtainable are employed.
YOU CAN NOT PURCHASE ANY FINER QUALITY

Their Testimony Proves

WHAT ACTUALLY HAPPENED

These three unretouched photographs show the results of tests of three nationally sold, popular brands of motor oil.



VARNISH...TRACE

Stabilized Quaker State Motor Oil. After comparative test . . . Note that piston is almost as clean as new.

VARNISH...HEAVY

30¢ motor oil. After comparative test this piston clearly shows a heavy accumulation of brown varnish.

VARNISH...VERY HEAVY

25¢ motor oil. After comparative test . . . Varnish so heavy pistons started sticking and test had to be discontinued.

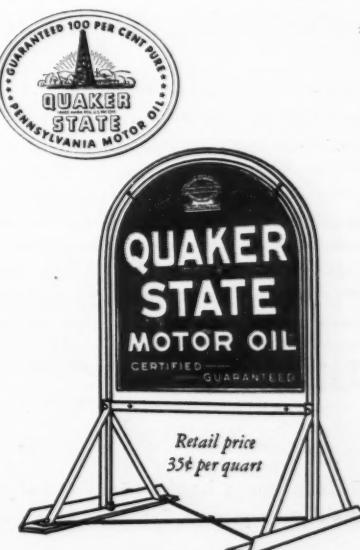
- Quaker State has developed a way to remove the unstable elements in motor oil . . . elements responsible for oxidation, for nearly all varnish, sludge and corrosion deposits.

You can quickly enjoy, in your own car, a new freedom from the expense and annoyance of engine damage and inefficiency which may accompany the use of inferior motor oils.

You will then be happy to recommend the New Stabilized Quaker State Motor Oil to all of your customers and friends. Quaker State Oil Refining Corporation, Oil City, Pennsylvania.

The New

STABILIZED QUAKER STATE MOTOR OIL



Petroleum Reserves Show Big Increases

An estimated increase during 1940 of more than a half-billion barrels in the proved petroleum reserves of the United States, lifting the Jan. 1, 1941, total to a new high of 19,024,515,000 barrels, has been reported by the American Petroleum Institute's Committee on Petroleum Reserves.

The committee ascribed the increase of 541,503,000 barrels over the 18,483,012,000-barrel estimate of Jan. 1, 1940, to discovery and development by the petroleum industry of 1,893,350,-

000 barrels of new reserves as compared with 1940 production of 1,351,847,000 barrels of crude oil.

The new total was said to include all grades of crude oil and distillate known to be recoverable under existing economic and operating conditions, but does not include reserves which may be found in favorable areas as yet untested. Explaining that the estimates refer only to reserves actually proved by drilling, the report said that pools tested by one or two wells have been assigned low reserves which may be considerably augmented by later development, a source of new

oil regarded as equally important as the original discovery of the field.

Thirteen of the 23 oil-producing states discovered or developed more oil than they produced in 1940, the report indicated, and with the sole exception of California proved reserves of every oil-producing state were increased by discoveries and by upward revision of earlier estimates in the light of new developments. Texas made the largest gain in reserves, 1,348,271,000 barrels in 1940, and now is estimated to have the largest reserves of any state, 10,623,516,000 barrels. Surprisingly large gains were reported from some states. Among these were New York, with reserves estimated at 65,001,000 barrels as against 35,392,000 a year ago; Nebraska, with 3,749,000 barrels as against 50,000; and Mississippi, with 40,242,000 barrels as against 6,642,000.

"It should be comforting to the American people to know that in times like the present, with war clouds hanging low over the world, the American petroleum industry again has discovered and developed more oil in this country than has been produced," commented Institute Executive Vice President W. R. Boyd, Jr., in receiving the committee's report from Chairman J. Edgar Pew, Sun Oil Co., Philadelphia, Pa. "This report, which is based upon the studies of reliable American petroleum geologists and engineers, indicates that for the fifth consecutive year the petroleum industry has increased the nation's crude-oil inventory. No other nation can boast such a record nor enjoy the satisfaction of knowing so much oil is available."

Solve your compressed air problem for years to come...

1.34 to 134
cu. ft. per min.
20 to 200
lb. pressure
 $\frac{1}{4}$ to 15
horsepower



These Worthington Features mean long service life

- Extra weight in castings and forgings... for long life in hard service.
- Individually-cast cylinders... proved the best type of construction.
- Simple light-weight Worthington Feather Valves... tight, quiet and efficient. Only Worthington Compressors have Feather Valves.
- Vertical cooling fins... for quickest dissipation of heat.
- Motors with high starting torque and low current consumption... designed specifically for start-and-stop service.
- Properly engineered Multi-V-Drives, with Goodyear EC Cord Belts... for full application of power without slipping or grabbing.
- Honed cylinder walls to mirror finish. Timken bearings on crankshaft. Automotive type suction muffler, finned intercooler, finned discharge line, air cleaner with removable element, non-pulsating check valve, reliable safety valve.



This 20-page booklet tells the story in detail.
Ask your jobber for a copy or write direct.

WORTHINGTON PUMP AND MACHINERY CORPORATION, HARRISON, NEW JERSEY

WORTHINGTON



"I could stand their taking the ten grand from the safe, but when they picked up my new MOTOR AGE -- !!"

**It's wise and profitable
to standardize on
Wagner CoMaX**

**.. there's no better
brake lining**

CoMaX is not just another brake lining. It is a superior quality product having the following features and advantages:

1. **CoMaX IS LONG LIVED.** It wears slowly and gives longer service.
2. **HAS REINFORCED BACKING.** Permits deep seating of rivets and increases thickness of lining available for braking service.
3. **NON-COMPRESSIBLE.** Does not compress under brake pressure. Brakes lined with Wagner CoMaX run for long intervals without needing adjustment.
4. **UNIFORM IN TEXTURE.** As the lining wears, the same type of brake surface is always exposed to the drum.
5. **EASY ON DRUMS.** Contains no abrasive material.
6. **EXCELLENT FOR HIGH SPEEDS.** Maintains its perfect performance under severe braking conditions.
7. **QUIET.** Grips silently. No howling or squealing.
8. **SMOOTH.** Uniform friction permits even, controllable deceleration.

9. **AGE-PROOF.** Does not deteriorate with age.

10. **RIGIDLY TESTED.** Wagner maintains 26 proving grounds.

The Wagner background of 16 years' research and experience in brakes is reflected in the amazing way that CoMaX stands up in service. Phenomenal performance has increased acceptance and is enabling servicemen to build a big, profitable volume on CoMaX. Comebacks are eliminated. Customers are pleased.

Act NOW to get your share of this profitable business. Ask your CoMaX Jobber for details, or write for free copy of Catalog BU-43B.

Clip and Mail Coupon Today!

AUTOMOTIVE PARTS DIVISION

MA 341-2A

Wagner Electric Corporation
6400 Plymouth Avenue, Saint Louis, U.S.A.

Please send free copy of Catalog BU-43B.

Name and Position _____

Firm _____

Address _____

City and State _____

I buy my lining from _____

SHOP KINKS

Here's your chance to pick up a little cigarette money. We'll pay three bucks (\$3) for every Shop Kink accepted and printed. So send 'em in to us—some short cut you use in doing a job easier and quicker than the other fellow—some special tool you made when you couldn't buy one to do the job—and we'll do the rest. Here are some that were accepted this month:

MAKING THE JOB EASIER

Here is an idea I have used for some time, but maybe the rest of the fellows haven't discovered it yet.

Every time I have a valve and carbon job to do I run an 8-oz. injection of top cylinder oil or penetrating oil through the carburetor just as soon as the car is driven into the shop.

Then, by the time I get the job down and get ready to take the valves out they are free in the guides and I have no trouble. This works particularly well with Ford V-8 engines, which have removable valve guides.

Before I started this I used to have trouble getting valves out—sometimes they would be stuck in the guides so tight that I had to use a puller. Now I have no trouble.

Just thought you might like to pass this idea along.—Ivo V. Pennington, Pennington's Garage, Wauneta, Neb.

SAVE 'EM FOR REFERENCE

I keep all Shop Kinks properly indexed under the name of the car so they are available for reference when I get stuck on a job. Then I don't have to look through back issues to see if I can find something about a particular job.

When the Shop Kink refers to a particular car I attach it to that page in my Chilton Flat Rate Manual covering that model. If it refers to all models of a certain make I attach it to the first page of that make. With these additions, my Chilton Flat Rate Manual becomes increasingly valuable with each issue of MOTOR AGE. Louis Grahek, Grahek's Auto Parts & Electric Service, Chisholm, Minn.

The Leaders improve engine run-in with **COLLOIDAL GRAPHITE**

The leading builders of airplane, automobile, tractor and motorcycle engines lubricate the run-in with "Oildag". Free and efficient action is more rapidly accomplished and closer tolerances maintained, when "dag" colloidal graphite is blended with the lubricant. ♦ ♦ Others who recognize that colloidal graphite improves run-in are manufacturers of lathes, presses, precision drills, pumps, reduction gears, compressors, crusher equipment, small mechanisms ♦ ♦ Ask your oil supplier about his colloidal graphited industrial lubricants to speed your production. ♦ ♦ Send for Bulletin No. 112.4 "The Value of Colloidal Graphite for Assembly and Running-in".

ACHESON COLLOIDS CORPORATION
PORT HURON, MICHIGAN



"That's just his tool kit—He gets gosh awful sick of guy's borrowing his stuff!"

Pontiac



is a lot easier to sell
than to sell against!

HERE'S WHY PONTIAC IS EASIER TO SELL THAN TO SELL AGAINST

- ★ Pontiac prices are within reach of any new car buyer.
- ★ Pontiac offers the year's most popular style at the industry's lowest price.
- ★ Pontiac gives buyers a choice of a Six or an Eight in any model with the Eight only \$25 more than the Six.
- ★ Pontiac has a wide variety of body types with one or more to satisfy every taste.

Competitive dealers by the hundreds now admit that they'd much rather sell Pontiacs than try to sell other cars against them.

For Pontiac has product and price advantages which no amount of salesmanship can offset.

Accurately described as "The Fine Car with the Low Price," Pontiac appeals to virtually every motor car buyer in America.

Pontiac style, quality and details of trim measure up to the expectations of people accustomed to driving high-priced cars. Yet the lower end of Pontiac's price range is so close to the lowest that this is literally true: *If you can afford any new car you can afford a Pontiac "Torpedo."*

With such a product to sell at such favorable prices, is it any wonder that Pontiac dealers are enjoying the most successful year in their history?

Right now Pontiac has a few openings for




IT'S ANOTHER
PROFITABLE YEAR
for
PONTIAC DEALERS

- ★ Pontiac style and quality appeal to buyers accustomed to high-priced cars.
- ★ Pontiac operating costs are known to be among the lowest.
- ★ Pontiac offers riding comfort and handling ease which compare favorably with the finest in the industry.
- ★ Pontiac has one of the most loyal and enthusiastic owner groups in all America today.

dealers in cities of various sizes and in scattered locations. For further information, read the panel below.

**ARE YOU LOOKING FOR
A NEW LOCATION?**

Are you looking for a new location? Are you dissatisfied with the line you are now handling? If you would like to consider a change of either your present town or your present line, or both, maybe Pontiac has just the set-up you are looking for.

Right now Pontiac has a few franchises—all of them representing potentials of 50 cars and up—available in scattered points in all sections of the U. S. Pontiac also has a few less-than-50 car points available. Each of these requires only a reasonable capital investment.

Write today and get all the details. Address your inquiry to the personal attention of Mr. D. U. Bathrick, General Sales Manager, Pontiac Motor Division, Pontiac, Michigan, and he will answer it personally.

SHOP KINKS

(Continued from page 106)

and back. Then I inflated the tire, and the blocks against the tire forced the wheel loose from the axle at 45 lbs. air pressure. Robt. T. Cooper, Orogrande, New Mexico.

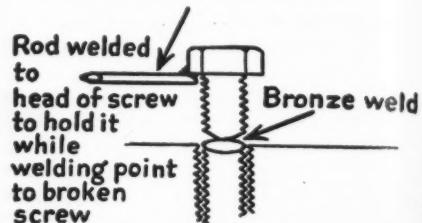
THAWING OUT GAS LINE

When we have a case of a frozen gas line we don't bring the car into the shop. We have in our service truck two 6-volt batteries connected in series, with wire cables having spring

clamps on the ends. We disconnect both ends of the gas line and connect the battery cables to the line, one at each end. Then connect the battery cables to the batteries, leaving them connected until the line starts to smoke, which is usually about 15 seconds. Then break the connections at the battery—if you break the connections at the gas line first you are apt to get an arc which will burn a hole in the gas line. The ice can't stand much of this kind of treatment, and will soon melt so that you can blow the water out of the line with a hand pump. J. B. Jones, Dalhart, Tex.

REMOVE BROKEN SCREW

Here's an easy way to remove the threaded shank of a screw or stud that has broken off flush with the surface of the metal into which it was fastened.

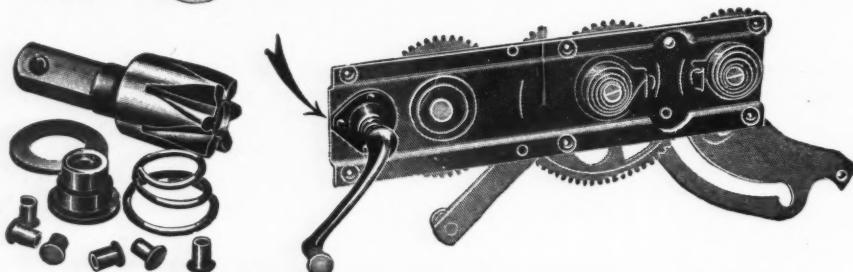


Be Prepared to fix those windows right now with WINDOW REGULATOR REPAIR KITS



Cut down stock inventories on window regulators. Window Regulator Repair Kits contain all necessary parts to repair old regulator in five minutes. Pinion gear is made of hardened steel, will last indefinitely. Packed 6 kits to box.

List \$1.00 per Kit.



No.	MAKE	MODEL
978	For V-8 & Model "A" Ford Cars and Trucks (6 Tooth Pinion)	1928-1941
978A	For V-8 & Model "A" Ford Cars and Trucks (5 Tooth Pinion)	1928-1941
985	For Plymouth, Dodge, De Soto & Chrysler (5 Tooth Pinion)	1930-1941
986	For Plymouth, Dodge, De Soto & Chrysler (6 Tooth Pinion)	1930-1941
991	For Chevrolet, Pontiac, Buick and Oldsmobile.....	1929-1938
992	For Chevrolet, Pontiac, Buick and Oldsmobile.....	1939-1940
993	For Chevrolet Trucks (5 Tooth Pinion).....	1930-1940
993A	For Chevrolet Trucks (6 Tooth Pinion).....	1930-1940
994	Window Regulator Kit Assortment (12 Kits to Assortment)	For Above Cars

ORDER FROM YOUR JOBBER



CHAMP-ITEMS, INC.

6191 Maple Ave.

St. Louis, Mo.

SPEEDOMETER CABLE

We have had a number of cases of broken speedometer cables, and in each case the cable was broken near the lower end where it attaches to the speedometer drive pinion. We also found that in each case the cable was rusty and dry, evidence of lack of lubrication.

We developed a fitting for lubricating the speedometer cable without removing it from the cable housing. We used the shell of a $\frac{1}{8}$ in. spark plug and welded a Zerk fitting in the upper end. The lower or threaded end is just right to take the coupling nut or sleeve of the speedometer cable housing. We simply connect the cable housing to the spark plug shell and apply a grease gun to the Zerk fitting. This forces lubricant into the housing for a distance of about a foot. Cables lubricated with this fitting have given no trouble from breakage.—Ted Shanks, Oliver Sales Co., Villisca, Iowa.

SPRING SPREADER

We had a job of installing a front spring in a 1939 Ford car, and had loaned our spring spreader to another shop. After fooling around with blocks and what-not, trying to spread this spring, I finally did the job with a bumper jack and a piece of 1 in. pipe, as shown in the illustration.—Mike Ferraro, Hacker's Parkway Service Station, 451 Bronx River Road, Yonkers, N. Y.

N.A.P.A.

National Automotive
Parts Association

Assurance of Quality

It pays to buy the best

NAPA

makes it easy for you to *get the best*—and to *be sure you're getting it!* The NAPA Seal identifies more than 50 non-duplicating automotive lines. Look for it on every part or package.

Master stocks of these parts—for *all* cars—are maintained in 38 NAPA Warehouses throughout the country. More than 1700 jobbers can thus give you prompt, convenient service (even on parts seldom needed) without waiting for "shipment from the factory."

NATIONAL AUTOMOTIVE PARTS ASSOCIATION

Executive Offices: 705 Fox Building, Detroit

These are the Products

WHICH CARRY NAPA'S
ASSURANCE OF QUALITY

ALLIED-A PC
Nukrome Valves, Valve Guides,
Pin and Boss Bushings

ALLIED-PRECISION
Piston Pins

ALLIED-RAYMOND
Valve Springs and Keys

ALLIED-WISCONSIN
Pistons, Cylinder Sleeves

AMERICAN BRAKEBLOK
Brake Lining, Clutch Facings,
Fan Belts, Radiator Hose

BALKAMP
Parts for Ford, Chevrolet and Plymouth.
Tie-Rod Ends, Shackles, etc.

BELDEN
Spark Plug Wire and Sets, Primary Wire
and Looms, Battery Cables,
Cordites and Soldering Irons

BROWN-LITE
Transmissions and Clutches

SUFFALO—Mufflers and Tail Pipes

CELORON—Timing Gears

DETROIT—Universal Joints

DITTMER—Transmission Gears, Shafts,
and Small Parts

DOUBLE DIAMOND
Drive and Pinion Gears,
Flywheel Gears, Axle Shafts,
Differential Parts

DUCKWORTH—Timing Chains

ECHLIN
Ignition Parts, Coils, Testing Instruments,
Electrical Bushings, Oil Pump and
Igniter Gears

FEDERAL—Ball Bearings

GRAPHO
Water Pumps and Parts, Packing

MARTIN-SENOUR
Spraying Lacquers, Synthetic Enamels,
Painter Specialties, Thinners, Reducers

MONMOUTH
Clutch Plates and Parts,
Engine Bearings, King Bolt Sets

NEW BRITAIN—Automotive Hand Tools

PURITAN
Hydraulic Brake Fluid,
Shock and Knee-Action Oil

RARITAN—Roller Bearings

SPICER—Universal Joints

STANDARD
Oil Seals and Grease Retainers,
Gear Adjustment Shims

TRICO
Windshield Wipers, Fans, Washers,
and other Vacuum-Operated Safety
Products

UNITED
Hydraulic Brake Parts, Brake Cables,
Fuel Pump Parts, Speedometer Cables
and Parts

—AND OTHER PARTS AND MATERIALS

A Nation-Wide Organization of Independent Warehousing Distributors



Gas profits are slim, and you have to give plenty of free service for every dollar you earn. Now you can boost that gas profit 30% or more, with the new 4 oz. can of MOTOR RYTHM; the right amount to add to 5 or 10 gallons of gas.

MOTOR RYTHM is more than a "top-cylinder lubricant," when added to the gas. It removes gum, carbon, and varnish. Prevents pre-ignition, pitted valves and fouled plugs. Consistent advertising in the Saturday Evening Post, every other week, year after year, has pre-sold hundreds of thousands of motorists . . . makes them ready to buy when you display and suggest MOTOR RYTHM, added to the gas as well as in the crankcase.

Get this FREE
Display Rack

This attractive metal Display Rack to stand right on the pump island, free with your order for 4 doz. 4 oz. cans and 1 doz. pint cans of MOTOR RYTHM. Generous supply of displays and sales aids also included.



MOTOR RYTHM

R. M. HOLLINGSHEAD CORPORATION, CAMDEN, N. J., TORONTO, CAN.
World's Oldest and Largest Manufacturers of Automotive Chemicals

Super-Service



Means

A woman driver owners would pay

"*SUPER*: Above in degree or amount; usually denoting excess."—Funk and Wagnalls Dictionary.

Occasionally we all get an idea that seems so obvious—so natural—that it's hard to understand why we never thought of it before. We had just such an idea the other day while thinking of super service stations, and we couldn't help wondering why it hasn't been in general practice for years.

The name *super* service station certainly implies the extraordinary—the really special—the "super." A real *super* service station should, therefore, offer services and products which are not offered by the ordinary service station or garage. But does it? No. In most cases super service means merely an attractive station, with a clean, new front, and shining display of merchandise. These are very necessary and important, yet they hardly make a garage a *super* service station in the sense that the customer has come to think of in *super* food markets and *super* drug stores.

Before automotive super service can compare to "super" merchandising in other fields, the service station would have to carry a diversified line of automotive accessories, personal items, and other aids to motoring comfort.

Needless to say, these items all have a profit for the dealer. Modern super drug stores certainly didn't evolve just because the pharmacist wanted better to serve his fellow men. The corner druggist found that added service meant increased sales, and increased sales meant added profits.

Here unpleasant impressions of the "variety" drug store may be recollected and cited as an objection to running an automotive five-and-ten-cent store.

Well, we're not advocating the heterogeneous display of a "5 & 10" either. We're talking of a service station that gives real super service. Certainly every service station could carry a number of small items and do it with dignity, profit, and even a minimum of worry. One such item is the disposable paper tissues now sold primarily to women as handkerchiefs, and as facial cleansing tissues for removing make-up. But they have a dozen other uses as any woman (and many men) can tell you.

This is the sort of item that is "different"—that distinguishes your place as "up-and-coming," and you as "progressive." You'd probably be glad to pay a little for that sort of publicity, and here is a way to make it pay for itself and even leave a little extra in the cash drawer.

There are a number of other things, too. If you cater primarily to a local trade, how about carrying a few of the popular magazines, or even the local papers? Magazines are usually bought with the comment (whether audible or not)

Extra Service

cites some necessities and conveniences for if service men would offer them for sale

By ROSE LU GOLDMAN

"There's the new issue of _____. I think I'll get a copy." Magazines are one of those items that's sold when seen. Now we're not trying to tell you there's a big profit in magazines but they're a "leader" that isn't a "loss." At least they pay their own way. People will start picking up a magazine when they come in to buy gas; soon you'll have some that come in to buy a magazine and also pick up some gas. Why they come in is of little importance; the point is that they come to you in preference to the man across the street.

Several drivers with whom we've talked have told us that they purchased flash lights, refill batteries, and first-aid kits from service stations simply because they were prominently displayed and caught their eye. Your 40 per cent profit on a 50-cent flash light is just as good in "cash received" as your cut on the sale of an extra ten gallons of gasoline, and you're always glad to get that.

If you're located on a main highway (where you cater primarily to the tourist trade) real super service would have to include more than the usual gas, oil, and lubrication—even more than the above mentioned suggestions for local service. Inexpensive sun glasses, a sun-tan lotion, and even a few well-chosen toys to amuse the youngsters on the long motoring days, have been found to have a ready market in stations catering to a transient trade.

If your state laws and license fees aren't prohibitive, a few of the more frequently called for headache remedies, cold alleviants, alkalizers, and aspirin would certainly be appropriate.

And, by all means, carry some sort of hotel and restaurant guide. Perhaps your road maps have such a guide on the reverse side, but, if not, the Duncan Hines books "Adventures In Good Eating" and "Lodging For A Night" are popularly recognized as good. A.A.A. also publishes an excellent hotel guide.

Paper cups are always in demand in a district where there are mountain springs along the roadside, so why not have some on display and remind your customers that now is the time to get some? With the growing popularity of cameras, film would also be a wise addition to your stock.

Display cases that can be wheeled out-of-doors into eye-catching positions are an excellent merchandising method for this sort of selling. Conspicuous dispensers, well-placed, have been the key to the successful handling of bottled soft drinks by service stations. They catch the eye of the pausing motorist and he almost sells himself.

All these items, if wisely selected and carefully displayed, require very little "show" room. The "variety store" objection will never occur to you again—for what you'll really have will be a *super* service station!

Make WHIZ your buy-word. It identifies a complete line of known quality and dependability.



Here's a THREE-WAY
PROFIT MAKER for you!

Here's the most outstanding product of its kind in the field...ready to boost your profits three different ways.

Use WHIZ WHITE TIRE COATING in your own work; sell it over the counter; use it to increase the value of used cars.

Not a paint. A liquid Latex! Made only by Hollingshead, from a patented formula. Forms a tough, long-lasting layer of pure white rubber. Will not chip, peel or blister because it is more elastic than the tire itself.

Use and sell this genuine rubber coating and increase your profits three ways—right now.



Attractive, sales-making counter display furnished with every dozen.

CAR BEAUTY and MAINTENANCE PRODUCTS

POLISHES • CLEANERS • TOP DRESSINGS • TIRE COATINGS
RADIATOR SPECIALTIES • BRAKE FLUIDS • ENAMELS
SHOCK ABSORBER FLUIDS • GASKET CEMENTS • SOAPS
ABRASIVE COMPOUNDS • SPECIALIZED LUBRICANTS

R. M. HOLLINGSHEAD CORPORATION, CAMDEN, N. J., TORONTO, CAN.
World's Oldest and Largest Manufacturers of Automotive Chemicals

George A. Parker

George A. Parker, one of the pioneers in air compressor design, succumbed to heart trouble at his home in Utica, N. Y., Feb. 12, after a few days' illness. He was born Feb. 24, 1879. He is survived by his wife and a daughter, Winifred, age 14.

George, as he was known throughout the industry, started with George L. Brunner at the inception of the Brunner Manufacturing Co. in 1907. He was a pioneer in the use of small air compressors and was largely responsible from the beginning for the

engineering development of the Brunner Air Compressor.

George Parker was recognized throughout the industry as one of its outstanding pneumatic engineers.

D. C. Gaskin Appointed

D. C. Gaskin is the new vice-president and general manager of The Studebaker Corp. of Canada, Limited, R. A. Hutchinson, vice-president and general manager of The Studebaker Export Corp. announced last month. Gaskin's promotion to the leadership of Studebaker operations in Canada

follows the transfer of M. S. Brooks to an executive position with the Studebaker organization in South Bend, Ind. Gaskin joined Studebaker of Canada in 1931, and his rise has been rapid since that time. He was made assistant sales manager in 1934, manager of truck sales in 1935, and sales manager in 1937.

Sloan Book Published

Alfred P. Sloan, Jr., chairman of General Motor, tells in *ADVENTURES OF A WHITE COLLAR MAN*, just published by Doubleday, Doran, how he rose from a job at the drawing board in a grimy Newark factory to the top place in the organization he now heads. Mr. Sloan's book was written in collaboration with Boyden Sparks, well known journalist and magazine writer.

Mr. Sloan's reminiscences, interestingly told, are packed with intimate detail concerning the men and women who built the automobile industry from scratch. The names of great figures stud his pages. The fabulous W. C. Durant, who could spend \$3,000,000 without batting an eyelash, who drove a hard bargain and ran his phenomenal company like an autocrat but who won and held the loyalty of top-grade personnel, is here, as are Bill Knudsen, the Dodge Brothers, Ford, Maxwell and Walter Flanders, mechanics all, as was Walter Chrysler, who came later.

Wheel Alignment Gages

Offered as a low cost unit to test wheel alignment of all cars, a special set of precision gages is being offered by the Bear Mfg. Co., Rock Island, Ill. The set includes a combination caster - camber - king pin inclination gage, a pair of turning radius gages, a toe-in gage, and a tire scribe. A tool display board is furnished with

Announcing the NEW Silent Factory Duplicate HY-POWER MUFFLERS

Designed and built to give maximum efficiency . . . low back pressure . . . cool operation and smooth, quiet performance. The crimped locked seams and turned ends prevent the escape of deadly carbon monoxide. Guaranteed Leak-Proof and Blow-Out Proof. Finished in a beautiful golden bronze.

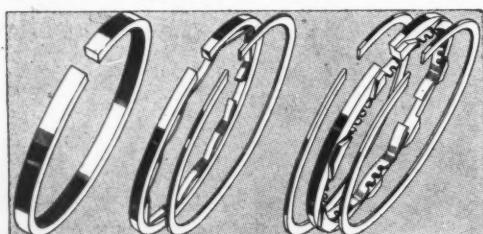
NEW 1941 MUFFLER CATALOG

Contains complete and up-to-date listings of HY-POWER Factory Duplicate and Multi-Fit Mufflers. Also a complete listing of tail pipes, etc. Write for your copy today.

"Quiet as a Mouse" . . . Dependable! More and heavier "guts"; built for perfect fit.

See Your Jobber or Write Direct

HICO Double Steel Segment PISTON RINGS



- SEAT QUICKLY
- LIGHT PRESSURE STEEL SEGMENTS
- NO WALL DRAG
- NO CYLINDER WEAR
- *Absolutely Guaranteed*

Tailor Made Combination Sets

HICO Rings are assembled and boxed in beautiful lithographed steel cans for each make of car. Each set contains the proper rings for greatest compression, efficiency and Oil Economy.



HICO Double Steel Oil Rings—seat quickly—work better and do not cause cylinder wall to wear! The inner ring exerts pressure only on the cast iron ring! In most segment type rings the inner ring pushes the steel segment under such great pressure against the cylinder wall that it causes excessive wear. Play safe with HICO Double Steel. Tailor Made Sets for All Cars.



the set, providing a handy place to keep the tools when not in use. The tire scribe is listed as a very necessary part of the set for scribing a center line on tires in connection with wheel alignment checking taken from tire center.



LION AUTO PARTS & MFG. CO. INC.

1920 S. Michigan Ave., 2214-20 Main St., 1239 Osborne St.
CHICAGO DALLAS MONTREAL



One of the striking series of illustrations appearing currently in Saturday Evening Post, Life and Collier's, and available in poster form.

PRE-SELLING BRAKE WORK FOR YOU

New opportunities for profit every 2,500 miles are now yours when you tie-in with Raybestos.

Thousands of Raybestos Safety Posters, put up by the police and safety groups all over the nation, and 49 million Raybestos advertisements in national magazines, are pre-selling car owners—right in your community—on the nation's number one safety service—having a wheel pulled* every 2,500 miles to see the condition of the brake lining.

More wheels pulled means more adjustments, relines, parts replacements—easily doubling your present profits.

Raybestos has a complete tie-in plan that enables you to cash in. Ask your distributor.

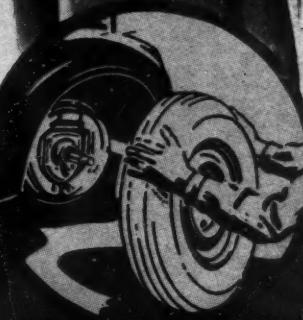
THE RAYBESTOS DIVISION of Raybestos-Manhattan, Inc.
BRIDGEPORT, CONN.

BRAKE LINING, CLUTCH FACINGS, FAN BELTS, HOSE • FOR CARS, TRUCKS, BUSES, TRACTORS

Raybestos

AMERICA'S BIGGEST SELLING
BRAKE LINING

"YOUR 2 BEST FRIENDS for HIGHWAY SAFETY"



*Every 3 wheels pulled
means an adjustment.
Every 5 wheels pulled
means a reline.



Timken Shifts Personnel

F. H. Lindus, formerly Los Angeles branch manager in charge of the service-sales division of the Timken Roller Bearing Co., has been transferred to the home office at Canton, Ohio, where he is engaged in general sales promotional work.

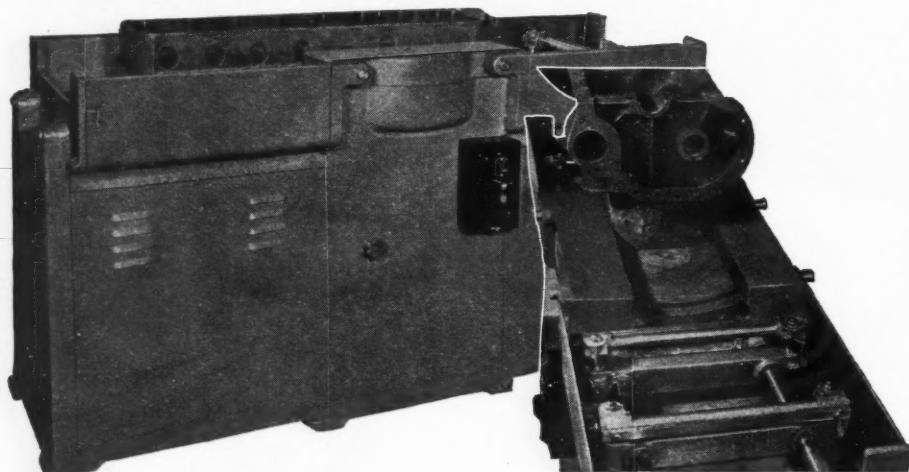
L. J. Halderman, branch manager of the service-sales division of the Chicago office, has taken Lindus' place in the Los Angeles branch office, while Jack Gelomb, formerly Detroit manager of the service-sales division, has filled the vacancy in the Chicago office. Joe Jesseph, resident salesman in the

Portland, Ore., branch, has taken Gelomb's place in the Detroit office.

Bishop to Direct New N.A.D.A. Washington Office

National Automobile Dealers Assn. established an office in Washington, D. C., at 319 Tower Building, last month. Office will be under the direction of Charles W. Bishop, general counsel of N. A. D. A., who is transferring his headquarters from Detroit to the nation's capital, where he will continue his legal duties for the association.

Resurface Cylinder Heads, Manifolds, Blocks, Fuel Pumps and Other Parts



on the LEMPCO Heavy Duty WET Surface Grinder

- It saves 50 to 90 per cent in labor costs.
- It grinds the average head or block in a few passes over the high speed cutting wheel.
- It grinds warped, pitted or even welded heads in a few seconds — or at the most, minutes.
- It produces a beautiful, smooth finish on even the softest aluminum or the hardest alloy heads — an exclusive Lempco feature.
- It's been tested and proven superior in industrial, production grinding.
- It employs the proven industrial principle of full grinding contact across the entire surface. It is not just a spot grinder.
- In short, it's the only Heavy Duty, Wet Grinding, Surface Grinder on the market.
- It is a WET GRINDER — no distortion, no clouds of dust, no loading up of wheel — as compared to dry grinding.
- Wet Grinding with Lempco-Cut compound gives you 75% more jobs per wheel dressing.
- It wet grinds cylinder heads, blocks, pressure plates, manifolds, fuel pump bodies or a thousand and one other money-making operations possible only with our full surface wheel.
- It has two to five times more power than other grinders.
- Its operating cost, including current and wheel wear, a fraction of a cent per head.
- No high priced mechanic required. Any novice can operate this new era machine.

Please send me full details on the Heavy Duty Wet Surface Grinder.

NAME _____

ADDRESS _____

CITY _____ STATE _____

**LEMPCO PRODUCTS, Inc.
BEDFORD, OHIO**

General Motors Report

Alfred P. Sloan, Jr., chairman of General Motors, in the corporation's annual report as released last month, revealed that in 1940 General Motors had gross sales of its products throughout the world that showed an increase of 30 per cent over 1939. At the same time, income and excess profits taxes mounted to levels that showed an increase of 180 per cent over the income taxes provided in 1939. Earnings after taxes were increased 6.7 per cent and dividends 7.2 per cent.

The 1940 payroll for the entire corporation was \$492,246,017, an increase of \$105,953,814 over the 1939 payroll and a gain of \$31,794,273 over the 1937 payroll, which was the previous high in G. M. history. In addition, regularly employed General Motors hourly workers last year received the highest average annual earnings in the history of the corporation, \$1,804 for 1940 compared to \$1,503 for 1939.

Laminated Shim Co. Names Three New Vice Presidents

New appointments of executives are announced by Laminated Shim Co., Inc., Glenbrook, Conn., following the recent meeting of its board of directors. E. B. Nisbet, formerly purchasing agent and treasurer, becomes executive vice-president of the company. E. R. Young, former factory manager, steps into an enlarged portfolio as the new vice-president in charge of production. Richard Seipt, as the newly appointed vice-president in charge of sales, takes on responsibilities in addition to those held during his term as sales manager. All appointments become effective immediately.



ELECTRO TEST EQUIPMENT

**"MAKES TUNE-UP PAY
"REAL MONEY"**



Don't try to handle tune-up jobs without the right testing instruments. It isn't fair to your customers or to your business.

MAKE accurate analyses and check your finished work with Electro Testing Equipment—and be sure of the results. These moderately priced, dependable instruments build reputation and volume for you. Put them to work—and make Tune-up pay "REAL MONEY!"

These Profit-Building Instruments
Can be Yours . . . at a Minimum Investment!

(At Top)

ELECTRO DE LUXE TEST STAND AND BENCH. Accommodates seven instruments. Siberian gray, wrinkle finish. Designed to catch the eye of the motorist and suggest the need of tune-up. Heavy steel. Dealer price with instruments as shown. \$285.75.

- 1—**TROUBLE SHOOTER**—Complete electrical check-up in 15 minutes. \$29.50.
- 2—**MIXTURE MASTER**—3-minute mixture check. Insures accurate carburetor adjustment. \$39.50.
- 3—**MOTOR PEAKER**—Fastest instrument for tuning motors to peak performance. \$17.50.
- 4—**CAM ANGLE INDICATOR**—Shows contact angle or breaker point dwell without removing distributor. \$27.50.
- 5—**ACROSET**—Combined Voltmeter, Ammeter and Variable Resistance. Enables service man to accurately set Relays, Regulators, Charging Rates, etc. \$39.50.
- 6—**COILMASTER**—Complete 2-minute coil check—high and low speed; tells the coil's true story. \$37.50.
- 7—**ELECTRO TWIN**—Combines Mixture Master and Cam Angle Indicator (items 2 and 4). \$77.50.
- 8—**TACHOMETER**—R.P.M. Indicator. For tuning-up work, setting governors, etc. Three scales—0 to 5000. \$42.50.
- 9—**ELECTRO BATTERY BOOSTER**. Charges battery in car in 30 min. Eliminates rentals and exchanges. A high powered battery salesman. Dealer price. \$169.50.

Buy on Easy Terms Through CCC
ELECTRO PRODUCTS CO.
621 E. 216th Street, New York

From your Jobber.
If he can't supply genuine "Electro" Products

USE THE COUPON

ELECTRO PRODUCTS CO.
621 E. 216th St., New York
Send me literature and prices of complete line of Electro Testing Instruments. Also Chemical line.
NAME
ADDRESS
CITY & STATE

Exide Annual Report

The Electric Storage Battery Co. and subsidiaries, with general offices in Philadelphia, report for 1940 a consolidated net income of \$2,167,592 after provision for contingencies, loss on foreign exchange, foreign income taxes and state and federal income taxes including the second Revenue Act of 1940. Net income is equal to \$2.38 a share on the total of 907,810 shares of capital stock outstanding in the hands of the public. This compares with net income of \$1,820,661 in 1939, equal to \$2.00 a share on the same number of shares outstanding.

Sales in 1940 amounted to \$33,151,906 as compared with \$28,408,743.

Crawford Vice-President

Harry F. Gray, president of International Piston Ring Co., 2401 West Superior Avenue, Cleveland, announces that at a recent meeting of the company's board of directors, Harry C. Crawford was elected vice-president of the company. Crawford, who has been closely identified with automotive engineering field, was, for over 20 years, associated with the Thompson Products Co., of Cleveland.

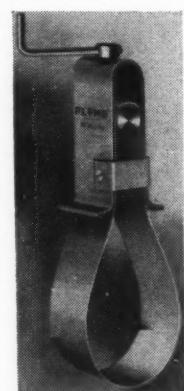
Handy Service Truck

Springfield Welding & Supply Co., Springfield, Ohio, has developed a handy service hand truck for use on used car lots. It consists of a hand truck with rubber tired wheels, mounting an air tank in the center and on



platforms on each side is space for a 2-gallon gas can and a booster battery. Balanced so as to be easy to handle, this servicer can be pushed about the lot and tires that are low on air pressure can be inflated, gas enough to start the car and run it to the pump can be installed, and the booster battery will take care of those hard-to-start jobs.

Piston Ring Compressor



A new piston ring compressing tool has been put on the market by the Plomb Tool Co., 2209 Santa Fe Ave., Los Angeles, Calif. Direct pressure is exerted on the ring by means of a steel band and a crank arrangement, in a way that is said to reduce the possibility of breakage to a minimum. The band is available in three sizes: small, for passenger cars; medium, for trucks and buses; and large, for Diesel units.

Shelburne Cutter for Removing Cylinder Heads

A new type of corrosion cutter for removing aluminum cylinder heads has been placed on the market by The Shelburne Mfg. Co., 818 Broadway, Hannibal, Mo. It consists of a circular cutter which slides over the head stud and cuts the corrosion between the head and the stud. The driving shank is mounted in rubber to make it flexible and self-aligning. The teeth are tempered to a high degree of toughness to prevent breakage, and yet they can be resharpened. The tool can be used with a tap wrench, bit brace or an electric drill.

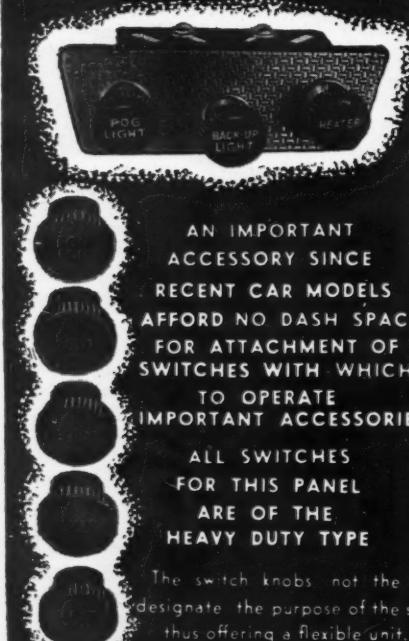


Perfect Balance!
in every
Cole-Hersee
PRODUCT

Yes Sir!

It's the "COHECO" Testing of every *Cole-Hersee* Product before it leaves the factory that assures you of the positive uniformity of precision workmanship and high quality of every *Cole-Hersee* Product. Any wonder *Cole-Hersee* Products are used by leading car manufacturers as original car equipment.

TRI-SWITCH AUXILIARY PANEL



AN IMPORTANT ACCESSORY SINCE RECENT CAR MODELS AFFORD NO DASH SPACE FOR ATTACHMENT OF SWITCHES WITH WHICH TO OPERATE IMPORTANT ACCESSORIES. ALL SWITCHES FOR THIS PANEL ARE OF THE HEAVY DUTY TYPE. The switch knobs, not the panel, designate the purpose of the switch thus offering a flexible unit.

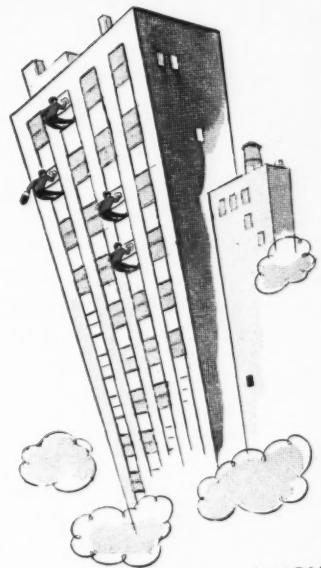
COLE-HERSEE COMPANY
54 Old Colony Avenue Boston, Mass.
Rep - Eastern Canada Ontario Quebec Maritime S F BACHER & CO 110 Spadina Ave Toronto, Ont

No. SD-13 KIT

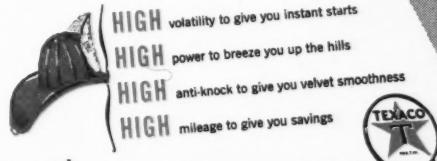


SEND FOR NEW 1941 CATALOG to Dept. A-4

*And may we remind
YOU
... that*



"That reminds me of the 4 HIGHS
in FIRE-CHIEF gasoline"



at
TEXACO DEALERS

TUNE IN FRED ALLEN—Texaco Dealers invite you to enjoy Fred Allen in the lively full-hour Texaco Star Theatre Program every Wednesday Night—C. B. S.—9:00 E. S. T., 8:00 C. S. T., 10:00 M. S. T., 9:00 P. S. T.

**These 4 HIGHS
will produce more
"bread and butter"
business for
Texaco Dealers**

HERE is one of a series of FIRE-CHIEF advertisements now appearing. Nationally . . . in the biggest weekly and monthly magazines. Reaching millions of motorists.

These advertisements are light . . . fast . . . getting over to these millions the four big benefits . . . why they should use famous FIRE-CHIEF gasoline.

Some motorists still ask for "regular" gasoline. More and more ask for FIRE-CHIEF by name . . . at Texaco Dealers, everywhere.

This advertising, plus the national advertising of four other separate brands, plus the special service national advertising that is signed by Texaco Dealers, means more business, better profits for Texaco Dealers.

Find out all about the profit set-up of a Texaco Dealer Franchise for yourself. Get the complete story from your Texaco salesman or write to us direct. The Texas Company, 135 East 42nd Street, New York, N. Y.

THE TEXAS COMPANY



TUNE IN FRED ALLEN—Texaco Dealers invite you to enjoy Fred Allen in the lively full-hour Texaco Star Theatre Program every Wednesday Night—C. B. S.—9:00 E. S. T., 8:00 C. S. T., 10:00 M. S. T., 9:00 P. S. T.



N.A.D.A. Silver Jubilee Planned for '42 Meeting

The dates of Jan. 20-21, 1942, have been set for the 25th annual convention of the National Automobile Dealers Association which will be held in Chicago.

Since this is the silver anniversary of the N. A. D. A. ambitious plans are under way for an appropriate celebration. Added significance is given the event because Chicago is the birthplace of the association. Headquarters of the convention will be in the Palmer House.

Salesmanagers Elect

Al W. Julius was elected president of the Buffalo Automobile Salesmanagers' Association for the coming year at the annual dinner meeting in Hotel Buffalo. Other officers are: Dan H. Taylor, vice-president; Anthony J. LaMastra, secretary, and Stuart H. Gibson, treasurer.

Dickinson Wins Trophy

As he did in 1939, George Dickinson put on a burst of speed in the homestretch to pass the late-season leader and win the 1940 sales contest

in the Automotive Division of the Van Norman Machine Tool Co., Springfield, Mass. Dickinson finished just ahead of Bob Ehrhardt, and now has permanent possession of the sales plaque presented to him by Sales Manager Charles R. Crowder. The winner also received a substantial prize check, as did Ehrhardt and 10 other members of the Van Norman sales force.

Booster Jamboree

The Automotive Booster Club, No. 13, New York City, will hold their Annual Automotive Industry Jamboree May 3 at the Pythian Temple, New York City.

The entertainment will consist of a floor show with Broadway and radio stars. There will be dancing to the music of one of the outstanding orchestras.

Tickets can be obtained from all members of the Booster Club or the chairman of ticket committee, J. P. Higgins, Sulco Sales Corporation, New York, N. Y.

Blankley appointed By Stewart-Warner

W. Houlton Blankley has been appointed district sales manager of the accessories division of Stewart-Warner Corp., according to an announcement by George Zahn, accessories division manager. His duties will consist largely of supervising the national accessory servicing training schools conducted by Stewart-Warner's accessory division, and aiding in the distribution of the company's most recent defense program accessory, the industrial tachometer.

A member of the accessories division at Stewart-Warner Corp. for the last 18 months, Blankley came from the sales division of Standard Oil Co. of Indiana.



The higher a product rises to the pinnacle of popularity, the better target it makes. For over two years, the Simplex "LL" Ring has withstood the pot-shots of the critics—yet is still flying high.

Some of "LL"'s prominent features have been incorporated in other rings but only in the Simplex "LL" will be found combined, all the remarkable features that have made the "LL" the outstanding reconditioning ring of all time.

That's why the Simplex "LL" will do the work alone that otherwise would require two or three different types of rings to accomplish. Simplex "LL" performs effectively for both oil and compression control.

In these busy times, Simplex Service can save and make you money—call your Simplex Distributor as soon as pistons are pulled and let him prove this statement.

SIMPLEX PRODUCTS CORP.
3820 KELLEY AVE. CLEVELAND, OHIO

SIMPLEX "LL" PISTON RINGS

Do a better job — give 'em "LL"!



"You know those things that save one-half on gas? Well, I got three of them!"

Meet YOUR PARTNER, boys

...he's Jim Asbestos,
the J-M Lifeguard!

As you can see, Jim is big, tough, powerful. He sums up all the features of J-M Brake Linings that make this famous line so profitable for you. He stands for hard-hitting J-M merchandising that brings customers to your shop. He stands for the 35 years of research and experience that make J-M Linings tougher, more durable, quality leaders in the field. Above all, he stands for *highway safety*... the quick, sure stops your customers get when you line their brakes with J-M Linings.

Next time you talk brake service to a customer, remember Jim Asbestos. He'll help you tell a more convincing sales story... make easier, more profitable sales. And if you're not familiar with the money-making advantages of J-M Brake Linings, write us today for the facts. Johns-Manville, 22 East 40th Street, New York, N. Y.



The Lifeguard of the Nation's Highways

JOHNS-MANVILLE BRAKE LINING



Perfect Circle Record

George W. Stoue, general manager of The Perfect Circle Co., Hagerstown, Ind., reports that in 1940 Perfect Circle made and sold more piston rings for both original equipment and replacement service than in any other year in the company's history.

Long Offers Free Survey on Fluorescent Lighting

As everybody's fluorescent lighting requirements are different, only a qualified lighting engineer should rec-

ommend units for major installations. To make such service available without obligation, a new, free Lighting Engineering Service is introduced by the W. H. Long Co., 425 N. Clark Street, Chicago.

It is necessary only to send the company a simple sketch of space, measurements, ceiling height, outlets and wattage of each. Full engineer's recommendations for proper lighting and complete cost information will be mailed to you without obligation. Address sketches direct to Mr. West. This free service should be of tremendous benefit to concerns which

would like to consider fluorescent lighting with all essential information before them.

Standards Association Publishes List for 1941

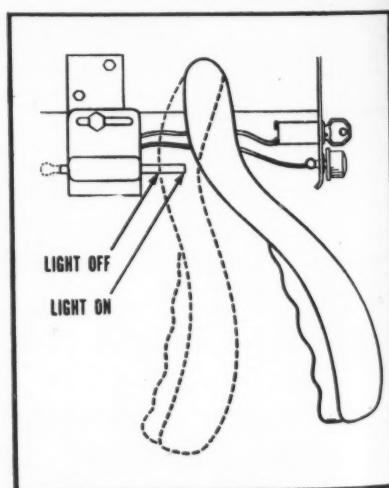
The American Standards Association has announced publication of a new list of American Standards for 1941. In view of the importance of standards and specifications not only for every-day work but to speed up production to meet defense requirements, this particular list of standards will be of unusual interest to industry.

More than 400 American Standards are listed, covering definitions technical terms, specifications for metals and other materials, methods of test for the finished product, dimensions, safety provisions for use of machinery, and methods of work. They reach into every important engineering field and serve as a basis for many municipal, state, and federal regulations.

This list of American Standards for 1941 will be sent free to anyone interested in the work. Requests should be addressed to the American Standards Association, 29 West Thirtyninth Street, New York, N. Y.

Signals Hand Brake "On"

The Liberty Foundries Co., Rockford, Ill., recently announced a new safety signal light that mounts on the instrument panel and lights when the hand brake has been left on. Can be installed on any car having the hand brake level under the instrument panel. Consists of small switch installed so as to contact brake lever, and bulb to give the warning light.



UP TO 40c MORE PROFIT FROM EACH REPAIR DOLLAR!

1 HYPRESSURE JENNY increases your net profit on repair jobs by saving 25% to 40% on labor costs! Steam cleaning before repairs saves the 15 to 25 minutes out of every man-hour which is usually spent in wiping grease and dirt from machine parts, tools, hands, etc. That's extra profit for you!

\$15 TO \$50 MORE FOR USED CARS!

2 When used cars are steam cleaned with HYPRESSURE JENNY to new car appearance, they move faster and bring from \$15 to \$50 more.

EXTRA-PROFIT JOBS WITH WASHES AND LUBES!

3 HYPRESSURE JENNY cleans motors and chassis spic-and-span. Sell these new-profit services with washes and lubes! For example, Jenny cleans a motor in 10 to 15 minutes—job sells for \$1.50 to \$3.00!

Investigate this 3-fold profit opportunity now. Fill in and send the coupon for a free survey today.

**HOMESTEAD VALVE MFG. CO.
P. O. BOX 95**

SEND FOR THIS
FREE SURVEY
TODAY!



O. K.—Send that Survey.

We recondition, repaint, repair.....cars or trucks monthly.

We employ.....mechanics on dirty, greasy repair work.

NAME.....

ADDRESS.....

Joint-Sealing Compound

A sealing compound for machined joints and gasket applications is being offered by the Radiator Specialty Co., Charlotte, N. C. Said to be non-hardening, non-solvent and heat-proof, the TiteSeal compound is available in 5 weights or densities; BR, light, medium, heavy and brush-on.

U.S. WALL LINER

A LUBRICATING FORTRESS



The Book of the Year is out
U.S. 1941 CATALOG
Send for your free copy

★ THE ★
U.S.
AIR COMPRESSOR
COMPANY
CLEVELAND, OHIO

HOUSED in this attractive "Sales appealing" U.S. JB 900 Wall Liner is a lubrication power house that will take on and handle all lubricating jobs with a speed, ease and efficiency that is amazing. Handles more cars in less time at less cost per job, and does a cleaner and more thorough job of lubricating. No back breaking work for the operator, the exclusive U. S. Jack-in-the-box covers, raises cabinet, pump, suction pipe and foot valve automatically by air. Under cover for instant action is the air operated high pressure chassis pumps, plus two air operated gear pumps. All piping is concealed and connected at back, unit presents a neat, trim and colorful appearance.

AIR COMPRESSORS • GREASING EQUIPMENT • HYDRAULIC LIFTS

Packard Presents the CLIPPER

A distinguished addition to the current Packard line—the Packard Clipper—embodies a fresh conception of functional styling, provides luxurious riding quality both front and rear, offers outstanding performance.

The Packard Clipper is mounted on a new chassis of 127-in. wheelbase and has an extremely low center of gravity, necessitating an entirely new chassis, new front and rear suspension. Mechanically, it represents many features new to the Packard line.

The improved ride, with rear seat comfort quite comparable to that in the front seat, is credited to a redistribution of weight, unique features in the rear suspension, and the adoption of a direct-acting fifth shock absorber incorporated in the rear stabilizer.

Among the novel features of body construction are a one-piece bonnet top which hinges selectively from either side and is latched from the car interior by control levers on each side of the instrument panel.

Save for increased compression ratio and increased power rating, the engine has the same mechanical specifications as the 120. However, it is



Front end view of Packard's new Clipper

not interchangeable, physically, due to many detail external differences, such as a new oil pan to take care of the forward mounting, and the introduction of special pads and attachments.

The engine is eight cylinder, in-line, L-head, 3 1/4-in. bore x 4 1/4-in. stroke, 282 cu. in. displacement, rated 125 brake hp. maximum, at 3600 r.p.m., with compression ratio of 6.85 to 1, with cast-iron head. It is mounted on three rubber mounts, the front being the same as that on the 120, the two rear mounts modified to suit a removable cross member at the rear of the

transmission which facilitates overhauling operations.

Crankcase ventilation has been improved by the introduction of a new ventilator arrangement. This incorporates a longer oil filler pipe raising the air inlet above the top of the engine, with its mouth facing the radiator. An electrically operated oil gauge is used. Starter motor control is by means of the accelerator pedal. A 17-plate Willard battery of 120 amp. hr. capacity is standard equipment. It is of end-to-end cell construction, mounted under the hood with a provision for cooling.

The transmission is essentially the same as formerly except for the adoption of new synchronizers which reduce shifting effort. In addition, it is fitted with an extension at the rear for the dual purpose of reducing the length of the propeller shaft as well as to permit the use of the new slip joint. Overdrive is offered as optional equipment, the length of the extension being so proportioned as to use the same propeller shaft. When the overdrive is specified, the extension is left off.

Electromatic drive also is offered as optional equipment. Incidentally, the control has been changed in detail by the adoption of a diaphragm type

(Continued on page 124)

STOP THOSE BIRDIES with THE "ALL-AMERICAN" TRIO

Illustration of a car with birds on it labeled AWK, SQUEAK, EEK, SQUAWK.

DOOR-EASE Dripless Oil

No lubrication job is satisfactory unless all squeaks and "birdies" are removed. You need these specialized lubricants to complete your service — they "last the life of a lube job". Order the "All-American" Trio from your jobber.

Enter as a rapid penetrating oil . . . congeals to a lasting, dripless lubricant. Use for hinges, locks, brake fittings and other concealed friction parts. "Runs in . . . Will not run out".

DOOR-EASE Stainless Stick Lubricant

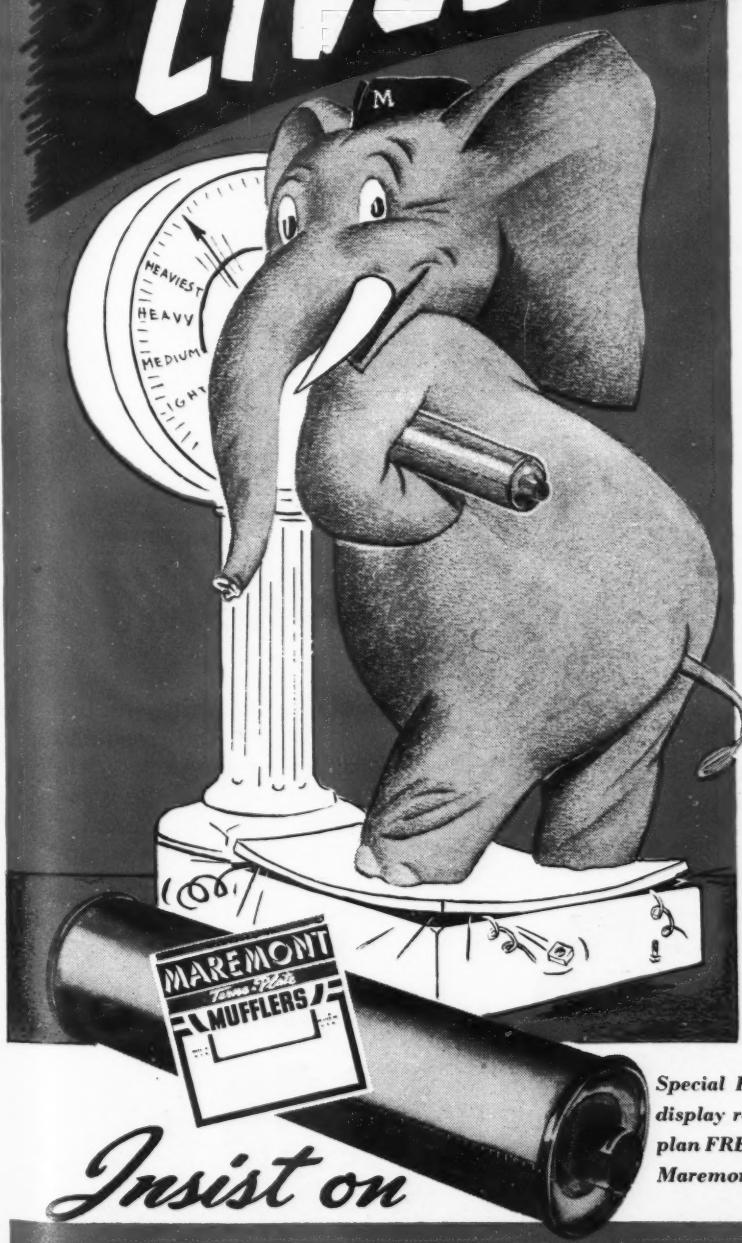
For exposed friction surfaces. Stops squeaks, binding and wear of door dovetails, striker plates, rubber bumpers and seals, hood lacings, etc. Won't stain clothing or car upholstery.

RUGLYDE Rubber Lubricant

For rubber parts requiring a penetrating lubricant. Safe on rubber — Lubricates and preserves. Safe on car finish — Won't harm the finest lacquers. Safe on service man — Non-flammable, non-poisonous.

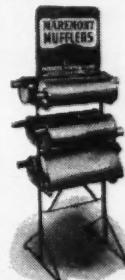
AMERICAN GREASE STICK CO., MUSKEGON, MICHIGAN
Canadian Sales Representatives: COLONIAL TRADERS, Ltd., 144 FRONT STREET W., TORONTO

HEAVIER and LIVES LONGER



PROVE IT TO YOURSELF

Put a sturdy Maremont Muffler on the scale and compare it with an "ordinary" muffler. Maremont Mufflers are up to 50% heavier! That's because Maremont Mufflers aren't built on a "diet." Our production lines are "fed" heavy terne-plate steel — to produce stronger mufflers with LONGER LIFE And that's why ONLY Maremont can give you an all-covering guarantee at no extra cost Weigh the other advantages of Maremont, too! "Self-cleaning" action with the patented venturi tube — locked crimped seams — spun heads — easier to install No wonder the fast-selling Maremont line has brought increases of 30%, 50%, and 100% in muffler business to thousands of service men You too can TIP THE SCALES TO BIGGER MUFFLER SALES! Call your jobber for genuine Maremont Terne-plate Mufflers — TODAY.



Special Free Offer: You can get this beautiful display rack plus wall charts and a proven sales plan FREE with an initial order! Ask your nearest Maremont jobber or write the factory for details.

Insist on

MAREMONT MUFFLERS

Maremont Automotive Products, Inc.

MAREMONT: MANUFACTURERS OF AMERICA'S

The Only
COMPLETE LINE OF
"TERNE-PLATE"
(LEAD COATED)
MUFFLERS

So. Ashland Ave. at 17th St., Chicago, Ill.

FAASTEST SELLING REPLACEMENT SPRING LINE

PACKARD PRESENTS THE CLIPPER

(Continued from page 122)

power cylinder which is said to improve clutch action materially.

Gear shifting effort has been materially reduced by the introduction of a unique linkage embodying a neutral link between the levers on the steering column and the linkage to the transmission. This eliminates errors in geometry due to the variable movement of the powerplant, thereby reducing the friction which usually results. The arrangement consists of a bell-crank mounting attached directly to the block for transmitting the shift and cross-over movement to the transmission. The vertical shaft for the mounting is pivoted at its lower end so that it is free to move only in the transverse plane. The upper end of the shaft is connected to the levers from the steering column. Although this produces a fixed alignment of the linkage to the transmission, it makes possible a neutralization of the misalignment between the steering column and powerplant due to lateral engine movement.

The chassis frame is entirely new, of double drop construction, with tapered side rails. It is exceptionally

wide to provide support for the wide body and is given great rigidity by the introduction of an X-member 9½ in. in depth. Side rails are stiffened by the use of box sections extending forward from the X-member to the front, and at the rear with extensions of the X-member over the kick-up, terminating at the rear cross member. A solid foundation both for the front suspension and engine mounting is afforded by an exceptionally wide and deep front cross member of box section.

Front suspension has the characteristics of the Packard Safe-T-Flex suspension but embodies an entirely different mechanical design. On the Clipper, it is essentially of the wishbone type with low frequency coil springs, continuing the use of the double-acting arm type shock absorbers. However, the radius arms characteristic of the standard Packard suspension system are not used. It is claimed that the new arrangement makes it feasible to divide braking torque between the upper and lower levers of the wheel suspension, thus making the radius arms unnecessary.

In the interest of better handling and ease of operation, Packard has introduced a total of 46 anti-friction bearings in various parts of the mechanism. An interesting feature of the front suspension is the adoption of needle bearings for the top end of the steering knuckle, plain bearings at the lower end, and, in addition, a ball bearing thrust bearing. Sealed threaded bushings replace the rubber bushings in the front suspension.

Rear suspension has new features despite the fact that it retains the characteristics of the current Packard Safe-T-Flex suspension system. In the first place, the rear springs, while of the same general design and incorporating the friction control buttons, are so mounted in the chassis as to carry the front ends closer to the center of the chassis, thus producing a tapered platform, said to promote lateral stability. Direct-acting shock absorbers are fitted at the rear but are mounted back of the rear axle with the top ends inclined toward the center. In addition, a new type of direct-acting shock absorber has been adopted for the fifth shock. It is an integral part of the rear stabilizer which extends from the frame bracket on one side to the axle pad on the opposite side. Rear shackles are rubber-bushed.

Lower Operating Temperatures



MODERN EQUIPMENT CORP.
DEFIANCE, OHIO, U.S.A.

Multiple cylinders materially reduce air friction . . . and the resulting lower operating temperatures definitely cut power and maintenance costs, positively increase efficiency and give longer life to the equipment. PAR Compressors, in the more commonly used 1½ H.P. and larger sizes, have 4 cylinders!

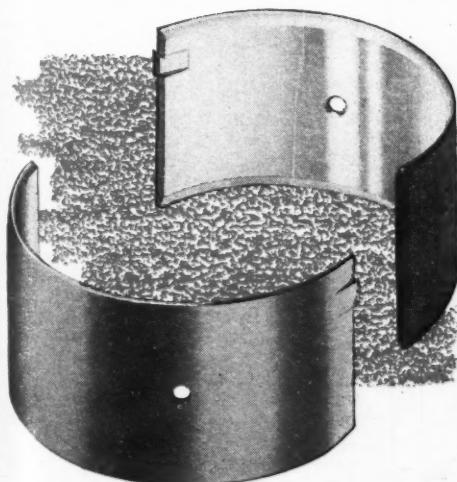
By Comparison — You'll Buy

PAR

"HOW TO BUY AN AIR COMPRESSOR" . . . a fact-filled catalog
and check list — is yours for the asking. Write for your copy today!



RING-TRUE BEARINGS



Yes Sir! Genuine Ring-True Bearings have delivered—year after year—the ever-increasing efficiency demanded by modern motor cars. That is why they are standard equipment in so many popular makes of cars, trucks, tractors and buses.

Install *Genuine Ring-True Bearings*—they cost no more. Ask your jobber.

Always Replace Bearings in Sets

*Complete Motor Bearing and
Connecting Rod Service*
CLAWSON & BALS, INC., Chicago



YOU CAN "RIDE" with the WINNERS

SAYS



- Get on board the BOWES "Seal Fast" Special Spark Plug Sales Plan if you want to make the big money this year! You can double your Plug Sales and protect your profits with BOWES "Seal Fast" . . . the "never-chiseled" Spark Plugs.

Rex Mays Wins 1940 AAA Crown with Bowes Plugs



Top championships were won with BOWES PLUGS in 1940 . . . proof a-plenty that they can "take it" . . . that they're top quality in ANY competition.

Jimmy Wilburn Wins Dirt Track Crown with Bowes Plugs



All over America and Canada, motorists are talking about buying BOWES Plugs because "Winners Use 'Em" and because the BOWES Plan gets 'em IN and helps you do a real selling job! Use the handy coupon . . . go places with the Winners!

Clayton Bishop Wins Hudson River Crown with Bowes Plugs

YOU CAN RIDE TO BIGGER PROFITS with



**DOUBLE YOUR
SPARK PLUG SALES!**

Mr. Bob Bowes
Bowes "Seal Fast" Corporation
Indianapolis, Indiana

Send the Bowes Man to Show Me How the Bowes Plan
Can Double My Spark Plug Sales.

Name _____

Address _____

City _____

State _____

BOWES

**SEAL
FAST**

**SPARK
PLUGS**

Special Torflex Bearings Offered as Stock Sizes

Establishment of a stock of low cost, standard size "Torflex" bearings (rubber backed for insulation of noise, vibration, shock, etc.) representing the more popular of the sizes heretofore manufactured exclusively as specials is announced by Harris Products Co., Detroit.

While standard as to diameters and in two torsional angles, even the standard sizes are available—without extra cost or delay in shipping—in optional or "special" lengths.

Range of the standard sizes, in diameters, is from 3/16 in. to 3/8 in. I.D. Corresponding outside diameters, for the 15 degree torsional bearings, range from 3/8 in. to 4 1/8 in. O.D.

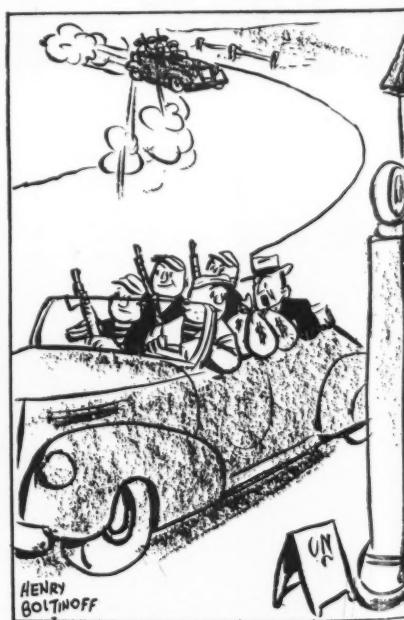
The same inside diameters apply for the 30 degree angle bearings, but the outside diameters are from 7/16 in. to 5 1/16 in.

Willys Sales Campaign

(Continued from page 56)

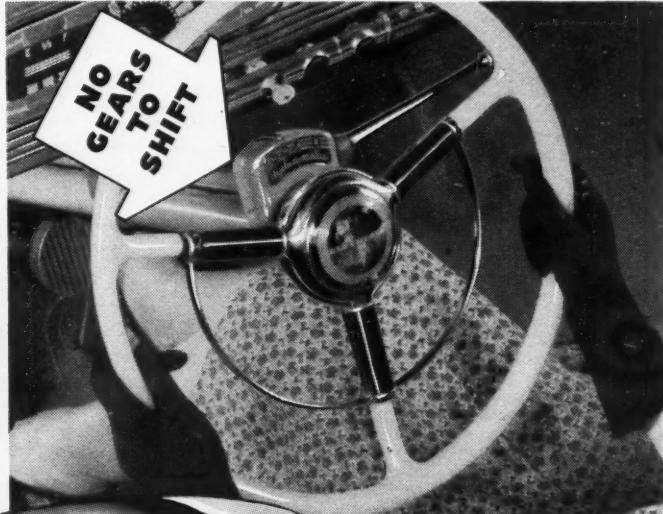
of defense material, including the Army reconnaissance car, 155 mm. shells, gun breeches, recoil cylinders and powder hoists. All this material is being made in factories not needed for the production of the Willys Americar.

Defense needs will result in a shortage of some materials, chiefly aluminum and zinc, according to Frazer, who stated that the company has anticipated this shortage by arranging to substitute stainless steel in place of the die-cast grille, cast iron heads in place of the aluminum heads, and similar substitutions where they can be made without affecting the performance of the car. Production of the Willys Americar is being stepped up to take care of the increased demand, and no new car shortage is anticipated.



"Do you hafta wait for change?"

SELL THE CAR THAT HAS THE DRIVE THAT GENERAL MOTORS BUILDS!



Only HYDRA-MATIC

is Completely Automatic!



"CONFIDENTIALLY YOURS"

SEND FOR THIS BOOK
OF INSIDE INFORMATION
ABOUT NEW DRIVES

D. E. RALSTON, General Sales Manager, Oldsmobile, Lansing, Mich.
Please send me "Questions and Answers about Oldsmobile's Hydra-Matic Drive" as prepared for Oldsmobile dealers and salesmen—in confidence and without obligation on my part.

Name _____

Firm Name _____

Address _____

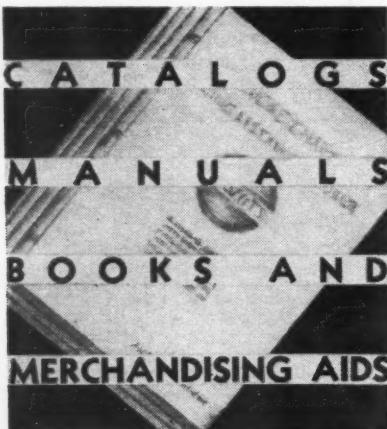
City _____ State _____

WHEN General Motors builds and backs it, you know it must be good! When 80,000 owners test and prove it in some 250 million miles of driving, you can rest assured it's "tops!" And when you reflect that Hydra-Matic is the only drive in the world that eliminates the conventional clutch and clutch pedal entirely...and gives *fully automatic* shifting through all four forward speeds ... you quickly realize that

Oldsmobile dealers are selling the drive that's distinctly out *ahead!* If you would like to know all about Hydra-Matic Drive...what it *is* and what it *does*...if you would like to know exactly how Hydra-Matic Drive differs from other drives, Oldsmobile will be glad to give you the "inside information." Simply fill in and mail the coupon. Learn why Hydra-Matic Drive—optional at extra cost—is a sure-fire business getter!

THERE'S Profit Ahead WITH
OLDSMOBILE
THE CAR Ahead





To receive a copy of the free literature mentioned in some of the following items, just check the square on the postcard on page 134, which corresponds to the letter given the literature you desire.

The Fourth Edition of Sealed Power's Sales and Service Manual on oil and gasoline economy has been released by Sealed Power Corp., Muskegon, Mich. It covers a complete discussion of the engine lubricating system, the causes and cures of excessive oil consumption and gives a step-by-

step outline of the work that should be done to deliver a complete overhaul job that will give satisfaction. Your copy is ready—just check "A" on the post card, page 134.

* * *

A 32-page piston ring service manual covering the practical phase of piston ring and piston expander installations has been released by The Ramsey Accessories Mfg. Corp., 3700 Forest Park Blvd., St. Louis, Mo. Gives helpful hints, short cuts, tips, check-up charts, etc. Check "B" on the post card, page 134, for your copy.

* * *

An interesting discussion of the use of alcohol made from farm products as a substitute for gasoline or for mixing with gasoline is given in a new booklet "Power Alcohol, History and Analysis," issued by the American Petroleum Institute, 600 South Michigan Ave., Chicago, Ill. To bring yourself up-to-date on this controversial subject, write for your copy. Simply check "C" on the post card, page 134.

* * *

The 1941 catalog of stock sizes of bearing bronze has been issued by the Johnson Bronze Co., New Castle, Pa. Every item listed in the catalog is available immediately from stock, according to the manufacturer. Ask for your copy—check "D" on the post card, page 134.

* * *

The U. S. Asbestos Division of Raybestos-Manhattan, Inc., Manheim, Pa., has a new wall chart announcing Grey-Rock's pledge to work to National Safety Council brake service standards and to use Grey-Rock engineering methods. Attached to this chart is a 48-page manual containing the latest servicing data for all passenger cars and popular model trucks. The chart is available through Grey-Rock jobbers. Check "E" on the post card, page 134.

* * *

The condition of spark plugs is an important item in spring tune-up. The cause of inefficient operation and the remedies are given in a 20-page booklet entitled "Spark Plugs and Engine Performance," issued by the AC Spark Plug Div., General Motors Corp., Flint, Mich. A check opposite "F" on the post card, page 134, will bring you a copy.

* * *

Nineteen models of high frequency electric tools are shown in the 1941 edition of the Thor High Frequency Electric Tool Catalog, issued by the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. An enlargement over the previous edition, Catalog No. 61 features a complete section of balancers and is fully illustrated with action as well as tool pictures. Your copy may be obtained by putting a check mark opposite "G" on the post card on page 134.

• You can loosen Mr. Car Owner's purse strings—convert minor adjustments into tune-up jobs—handle more work faster and make more money with NIEHOFF Precision Instruments in your shop. The easy-to-read meters show your customers the exact condition of the electrical system. And these instruments will prove that Niehoff Ignition Parts will step up starting, power, and gas mileage. These Niehoff portable units are accurate in every detail, can be carried right to the car and operated in full view of the owner. Yet, they are priced so low that every repair shop can have them.

FREE TUNE-UP FACTS

Complete binder of practical and technical tune-up facts that will enable you to put this Niehoff Equipment on a paying basis right from the start. Free with every unit.

Call Your Jobber TODAY about easy payment through automotive equipment time payment terms.



Model T-8
Compression Gauge



Model T-9
Vacuum Gauge



Model T-1
Testoscope



Model T-2
Voltmeter



Model T-5
Time-O-Lite

BRANCH: 1342 S. FLOWER ST., LOS ANGELES, CAL.

C.E.NIEHOFF & CO • 4919 LAWRENCE AVE. CHICAGO, ILL.

131 CAR DEALER FRANCHISE. When you're selling the OLDSMOBILE with the HYDRA-MATIC DRIVE you've really picked a winner. Page 131. Fill out coupon or check postcard for booklet.

132 PRECISION INSTRUMENTS. Give your shop Super-Service Appeal with NIEHOFF PRECISION INSTRUMENTS. They're shown on page 132. Check postcard for booklet of Tune-Up Facts and details of time payments.

133 PERIODICAL. LIFE may not cover the population like "the blue sky" but it comes closer than any other publication. Have you seen the latest figures on circulation? See pages 136-137. Check postcard for details.

138 CAR-TRUCK DEALER FRANCHISE. CHEVROLET'S service to the community is told in their story on page 138. Check postcard for literature and information on available territories.

139 BALL BEARINGS. For every BALL BEARING replacement location SKF has the type. Don't fail to read page 139. For further information check postcard.

140 BRAKES. Page 140 lists a few of BENDIX'S PRODUCTS, including CAR-BURETOR, GEAR SHIFT CONTROL, UNIVERSAL JOINT and BRAKING PARTS. For complete information check postcard.

141 CAR DEALER FRANCHISE. The "stand-out" BUICK Franchise is still open to go-getting businessmen. Don't miss page 141. Check postcard for information on available territories.

142 MOTOR OIL. VALVOLINE celebrates its Diamond Jubilee and invites you to sell-brate. Page 142. For details on DEALERSHIP and SPECIAL AWARDS check postcard.

143 SEALED-BEAM LAMP. G-E MAZDA dissects one of its "ALL-GLASS" UNITS on page 143 to show you the quality of construction. Check postcard for detailed information.

144 GASOLINE. On page 144 you'll find a Service Bulletin issued by the ETHYL GASOLINE CORP. with an interesting message. Check postcard for available information.

145 HYDRAULIC JACKS. Don't run a "one-jack" shop. With HEIN-WERNER'S inexpensive line of HYDRAULIC JACKS you can operate faster, less time charges. Page 145. Check postcard for details and prices.

146 AUTOMOTIVE EQUIPMENT PLAN. Now you get those new tools, new machinery through the COMMERCIAL CREDIT'S PLAN. Don't miss page 146. Check postcard for full details.

147 CAR DEALER FRANCHISE. Have you investigated the possibilities of the CHRYSLER-PLYMOUTH FRANCHISE. You'll find the data on page 147. For further information check postcard.

148 ELECTRICAL TOOLS. The UNITED STATES ELECTRICAL TOOL CO. displays its line of tools on page 148. Check postcard for Catalog No. 55 . . . the full line of AUTOMOTIVE TOOLS.

149 AUTOMOTIVE ELECTRIC CABLE. On page 149 you'll discover WHY the PACKARD CABLE and CERTIFIED RE-WIRING SERVICE ranks so highly with shop men. Check postcard for complete information.

151 TIRE VALVES. Schrader tells the tale on page 151. Are you using this guaranteed TIRE VALVE to promote customer good-will? For complete information check postcard.

152A TRACTOR FRANCHISE. Don't overlook OLIVER FARM EQUIPMENT SALES CO. when seeking a profitable DEALERSHIP. See page 152. Check postcard for details on available territories.

152B ROLLER BEARINGS. There's a story on page 152 by TIMKEN describing the excellence of the steel used in TIMKEN BEARINGS. Don't miss it. Check postcard for full TIMKEN information.

153 BATTERY. Prices are down this month! That's what VESTA tells you about their batteries on page 153. Check postcard for exclusive features of the VESTA BATTERY.

154A MOTOR PENETRANT. Don't miss the OAKITE QUIZ on page 154. It'll give you a few hints on the safe, easy way to clean that cooling system. Check postcard for FREE 36-page booklet.

154B QUINPLEX. An instrument replacing the gas tank cap, the QUINPLEX offers substantial fuel-saving and eliminates vapor lock. Don't miss page 154. For testimonials and proof check postcard.

154C MUFFLERS. On page 154 meet the new HAVILAND Super DeLuxe MUFFLER of ARMCO Aluminized Steel. It's built to last. Check postcard for new 1941 Muffler Catalog.

154D SHOP TOOLS. Here, DURO METAL PRODUCTS CO. presents the last word in efficiency with their display of DURO TOOLS on page 154. Check postcard for latest catalog.

155A GASKETS. There's a FITZGERALD GASKET for every automotive use. Don't fail to read page 155. Check postcard for details of FITZGERALD'S Merchandising Plan.

155B AUTOMOBILE RECONDITIONING PLAN. When you offer your customers the convenience of COMMERCIAL CREDIT'S PLAN you are building up profit. Page 155. Check postcard for complete information.

156A LATHE. It pays to have an ATLAS LATHE for those valve grinding operations. It's pictured on page 156. For further information check postcard.

156B WELDING MATERIAL. With the MILLER MFG. CO.'s new WELDING MATERIAL . . . WONDERWELD . . . you can repair water jackets, valve ports, cylinders in a few minutes. Page 156. Check postcard for details of MILLER Line.

156C REPLACEMENT ROLLER BEARINGS. Don't miss your share of this profitable BEARING BUSINESS. Read ROLLER BEARING CO. OF AMERICA'S ad on page 156. Check postcard for name of jobber near you.

156D HOTEL. Coming to New York? Then you'll find typical Gotham hospitality at HOTEL WELLINGTON. Page 156 gives you further details. Check postcard for rates and other information.

156E WHEEL BALANCING WEIGHTS. On page 156 you'll see the new L & H WHEEL BALANCING WEIGHT for cars. Mfrd. by HARLEY C. LONEY CO. Check postcard for free literature.

156F RATCHET WRENCH. The new, improved BEALL SPEED-RATCH is the tool you've been looking for. Gets in those out-of-the-way spots. Page 156. Check postcard for full details.

157A DECREASER-ENGINE WASH. With GUNK and MOTOR FIZIK, products of the CURRAN CORP., you can rid motors of sludge and dirt, inside and out. Page 157. Check postcard for latest data.

157B FOG LAMPS-CONVERSION KITS. ARROW SAFETY DEVICE CO. offers their SEALED BEAM FOG LAMPS and CONVERSION KITS on page 157. Check postcard for full particulars.

157C GLASS-SETTING MATERIAL. EVERSEAL, recommended by large plate glass companies, affords you a perfect seal on glass work. Page 157. Check postcard for latest information.

157D CAR WASHER. You may never have a chance to "laundry" an elephant but shows you an H-1 CAR WASHER by CHAMPION PNEUMATIC MACHINERY CO. that could do it. Check postcard for Booklet.

158A CLEANING CHEMICALS. Here's the material that cleans out sludge in short order . . . MAGNUS METAFFIN. For details on MAGNUS Line see page 158. Check postcard for Automotive Cleaning Handbook.

158B GASKETS. With a stock of VELLUM-OID in sheet form on hand you can cut your gaskets yourself at less expense. Don't miss page 158. For further particulars check postcard.

159A SPARK PLUGS. Here's a SPARK PLUG that's different! It's the LEONARD AIR-COOLED SPARK PLUG shown on page 159. For detailed particulars check postcard.

159B DIRECTIONAL SIGNAL SWITCH. There's only one BURN-OUT PROOF DIRECTIONAL SIGNAL SWITCH and the SIGNAL-STAT CORP. makes it. Shown on page 159. Ask your jobber or check postcard for information.

159C TIRE GROOVER. Here's the real Spring Tonic for profits . . . the CHAMPION TIRE GROOVER mfd. by O. E. THOMPSON & SONS. It's on page 159. Check postcard for complete information.

159D EXHAUST ANALYSER. Accuracy is the key-word when you're using an ENGELHARD EXHAUST ANALYSER. Page 159. Check postcard for Bulletin 601.

160A GASKET CEMENT-MOLD. With the PAX Line of GASKET CEMENT and GASKET MOLD your service reaches a new high of efficiency. Shown by JOHN S. MCKENZIE on page 160. Check postcard for details.

160B BRAKE LINING. Have you tried SOUTHERN FRICTION MATERIALS CO.'s line of BRAKE LINING yet? Don't forget CHARLOTTE SOUTHERN on page 160. Check postcard for latest information.

160C GEAR FLUSHER. With an ARO VISI-FLUSHER you can triple your gear-lube sales in no time. It's shown on page 160. For complete particulars check postcard.

160D METAL REPAIR. With MENDALL METAL you can quickly, easily, inexpensively handle those leaks, cracks, splits or holes in metal parts. 4A PRODUCTS CO. shows you on page 160. Check postcard for information.

160E BRAKE FLUID. Play safe! Use PURITAN the genuine REFILL BRAKE FLUID . . . mixes with all others. Don't fail to read page 160. Check postcard for complete information.

160F GASKETS. Both you and your customers profit with FEL-PRO GASKETS shown on page 160. Check postcard for complete Gasket Catalog.

160G DIRECTIONAL SIGNALS. This is the DIRECTIONAL SIGNAL designed for long-life truck service. TELEOPTIC recommends it on page 160. Check postcard for details.

160H TAPERED ROLLER BEARINGS. Don't forget TYSON TAPERED ROLLER BEARINGS when that next heavy-duty replacement job comes in. Page 160. Check postcard for available details.

161A FENDER SPREADERS. On page 161. G.A.C. MFG. CO. displays 3 Profitable investments in FENDER SPREADERS and a POWER UNIT. Check postcard for latest catalog.

161B TESTING EQUIPMENT. Tune-up time is just around the corner. With ELECTRIC HEAT CONTROL'S "KING" TESTERS in your shop, you're all set. Page 161. Check postcard for details on Time Payments.

162A AUTOMOTIVE PARTS. The KREGER Line of PARTS shown on page 162 offers you several new approaches to Profit. Fill-out coupon or check postcard for Special Introductory Price List and Discount.

162B VALVE GUIDE BRUSHES. With RIMAC VALVE GUIDE BRUSHES you can do a thorough job of valve cleaning. RINCK-McILWAINE, INC., show you on page 162. Check postcard for further information.

162C TIRE PATCHES. With SPEAKER MATCH PATCHES you can furnish tire repairs at a moment's notice. Don't miss page 162. Check postcard for details and price lists.

162D BATTERY CHARGER. Here's the HANDY SUPER SERVICER, a QUICK BATTERY CHARGER made by BALDOR ELECTRIC CO. to meet that rush order. Page 162. Check postcard for available information.

162E HOSE CLAMPS. WITTEK MFG. CO. manufactures the NO-CUT HOSE CLAMP shown on page 162. For fast, dependable hose connections you can't beat it. Check postcard for details of line.

163A TAPERED ROLLER BEARINGS. The perfect replacement line for all makes of cars, busses, trucks and tractors . . . PRATT TAPERED ROLLER BEARINGS. Page 163. Check postcard for data.

163B PORTABLE ANALYZER. Install a STROMBERG PORTABLE ANALYZER and offer new accuracy with your SPRING TUNE-UP service. It's on page 163. Check postcard for latest information.

163C AIR HORNS. Appearance, tone and serviceability . . . BUELL AIR HORNS afford all three to your satisfied customers. Page 163. Check postcard for literature.

163D ELECTRIC DRILL. Don't fail to check on the SPEEDWAY 1/2" DRILL shown on page 163. It's a "must" item for any shop. Check postcard for free circular.

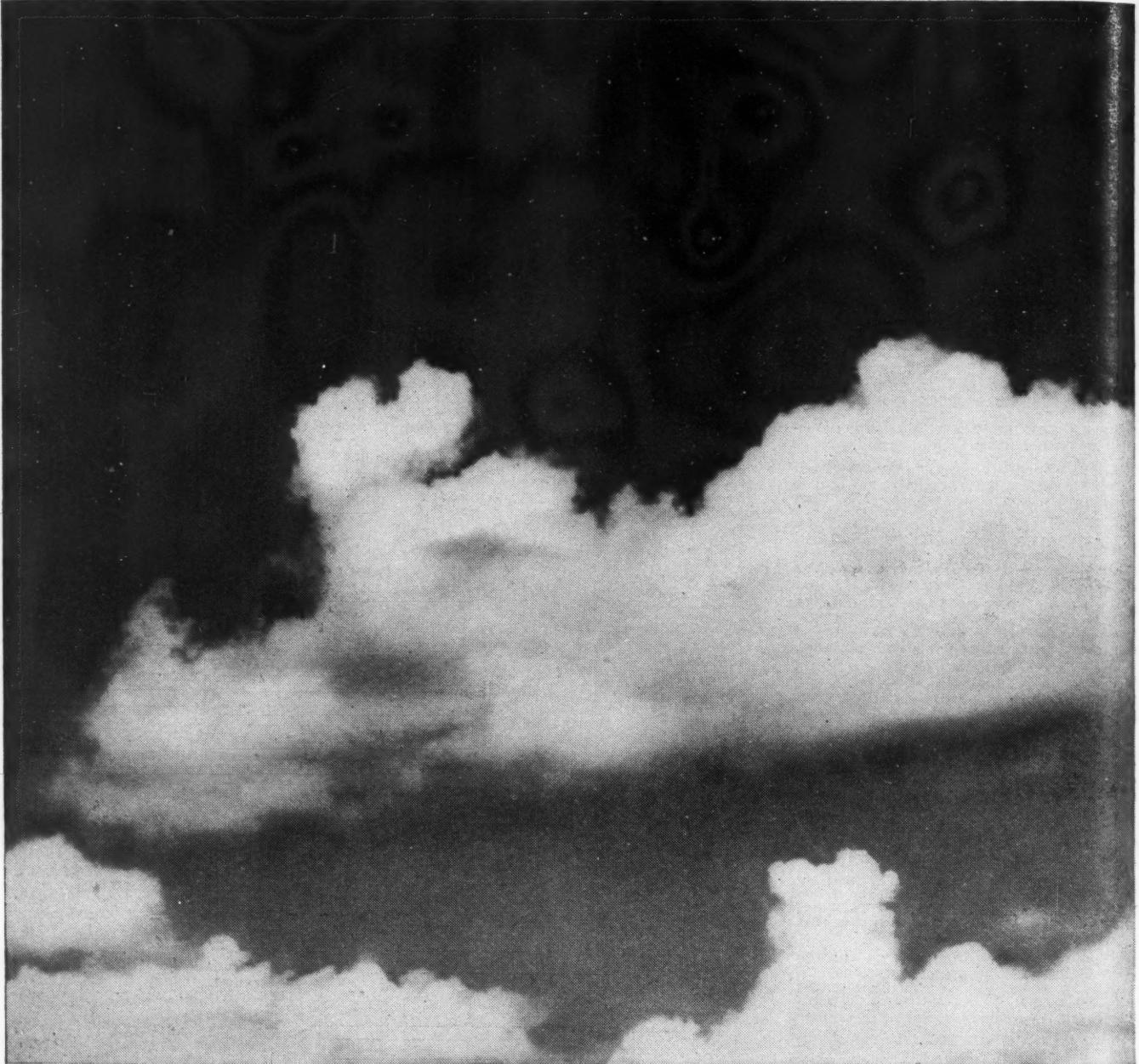
163E WHITE TIRE COATING. WHIZ WHITE TIRE COATING will dress up a customer's car in no time and at very little expense. See page 163. Check postcard for full particulars.

163F GASKETS. For seals of security, industry depends upon the VICTOR Line of GASKETS, OIL SEALS and GREASE RETAINERS. See page 163. For further information check postcard.

163G BATTERY CHARGER. When you've checked into the VALLEY SUPERDUTY BATTERY CHARGER you need go no further. See page 163. For information on MODEL SG-12 check postcard.

163H AIR COMPRESSORS. On page 163 you'll find a COUPON to be filled out and mailed to WAYNE PUMP CO. How's your WAYNE COMPRESSOR working? Check postcard for further information.

166 CAR DEALER FRANCHISE. There are 5 reasons on page 166 as to the superior features of a CADILLAC DEALERSHIP. Don't miss them. For information on available territories check postcard.



Frankly, it beats us!

● NO QUESTION ABOUT IT. The sky beats LIFE for coverage of the great mass of American people—

But LIFE's net paid circulation now tops 3,000,000.

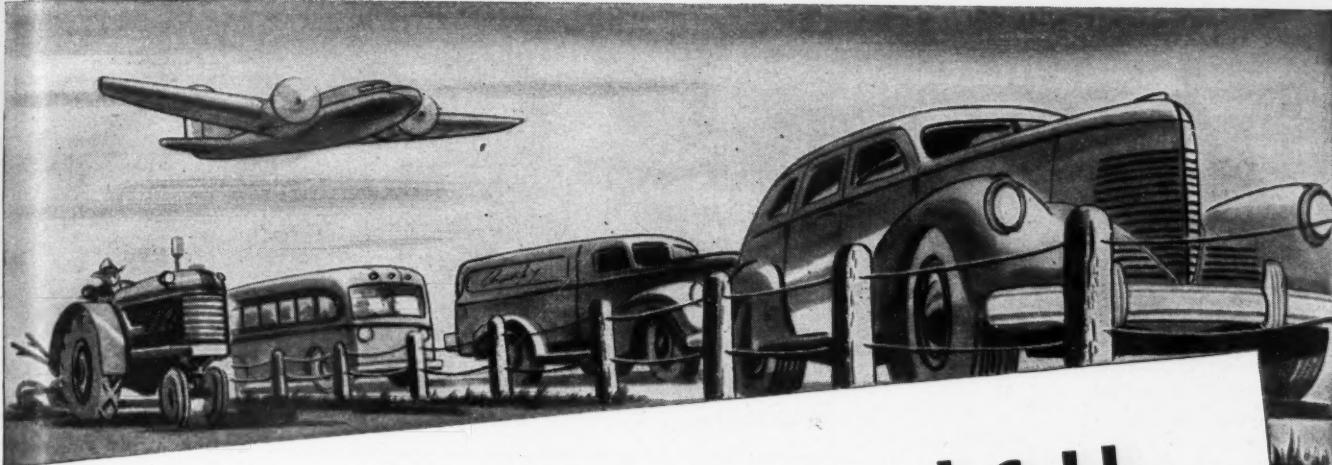
And scientific research—like that which so accurately polls public opinion—shows that those 3,000,000 copies are read each week by a total audience of more than 20,000,000 people.*

It's no mere accident of publishing luck that LIFE has

become the most stimulating reading event of the week for all these people.

LIFE earns this enthusiastic, ever increasing audience because it offers these millions truth and reality about the fast-moving world they are trying to comprehend—and does it in an exciting way they *like* and *understand!*

They find, too, that LIFE's advertising pages ably complement the editorial pages, in carrying useful, lively, informative news pertinent to modern



Why and How Packard Cable Means More Business for You

Most cars, trucks, buses, tractors and planes have Packard cable for original equipment. That means more and better business from satisfied customers for the service stations that use Packard cable for replacements.

Here's Why

Because Packard cable is the choice of leading automotive engineers for a majority of all original equipment applications—because it is the volume leader—it is better cable for replacements. Consider these advantages:

1. Large volume production economies make possible better cable for the money.
2. More experience in manufacture and use means better products.
3. The experience of the many leading automotive engineers who specify Packard cable is also Packard's to use.
4. Packard's large volume of business makes possible fine research laboratories which develop continuous improvements and new products.
5. Large production capacity assures a stable and immediate source of supply for all replacement needs.

Add up these advantages and you have some very good reasons why Packard cable is the accepted leader for replacements—why customers are looking for Packard cable service—why you should use Packard cable.

Here's How

Get a stock of Packard cable from your Packard jobber today. Ask him about the highly profitable Packard Certified Re-Wiring Service, or write direct to Packard Electric Division, General Motors Corporation, Warren, Ohio.

Packard
REG. U. S. PAT. OFF.
TRADE MARK

THE STANDARD WIRING EQUIPMENT OF THE AUTOMOTIVE INDUSTRY

JOBBER'S DIGEST OF THE APRIL MOTOR AGE

Following is a brief digest of important articles appearing in this issue of MOTOR AGE. Read the digest and discuss the service procedure with your customers.



EQUIPPED FOR THE FUTURE

Is this the time to buy new repair and maintenance equipment? Although this shop was already earning more than its fair share of business, the dealer decided he was not equipped for the volume of service business expected to result in months to come.

A CHECK LIST FOR SPRING TUNE-UP

Here is a lavishly illustrated article, invaluable to the service man at this season. It describes 24 separate operations and inspections, necessary to put an automobile in first-class running condition after a winter's wear.

LUBRICATION JOBS UP

The possibilities uncovered by this shop are bound to make others look into their lubrication department with a more critical eye.

TUNE-UP MANUAL

This annual feature of MOTOR AGE, eagerly awaited each spring by service men, is presented again with its wealth of detail on current passenger cars and its invaluable hints on service procedure. The information it contains is available to the service man in this brief, readily accessible form only in MOTOR AGE.



VITAL SERVICE

Another article describes plans being laid to train new mechanics. And still another suggests extra items a service station might easily sell.

HOW'S BUSINESS A MONTHLY REPORT ON MAJOR ITEMS BY 500 JOBBERS

MARCH, 1941

NATIONAL TOTAL	Good	Fair	Poor	NATIONAL TOTAL	Good	Fair	Poor
ACCESSORIES	Poor			SHOP EQUIPMENT	Poor		
Abrasives.....	21	37	66	Battery Charging Equipment.....	12	36	49
Anti-Freeze.....	17	74	121	Car Lifts.....	1	39	62
Car Radio Sets.....	1	92	113	Car Washers.....	1	63	79
Car Radio Accessories.....	5	86	101	Compressors.....	29	13	72
Chains.....	29	72	111	Drills (Electric).....	18	42	31
Heaters.....	30	59	137	Electric Testing Equipment.....	15	50	60
Horns.....	14	52	43	Jacks (Garage).....	12	70	41
Lacquers.....	4	59	38	Lubricating Equipment.....	20	47	59
Oil Filters.....	81	39	12	Paint Spray Equipment.....	1	51	51
Oils and Greases.....	10	30	57	Tire Service Equipment.....	15	47	72
Polish.....	3	65	29	Tools Kits and Sets.....	13	56	46
Seat Covers.....	38	41	63	Valve Refacers.....	8	17	111
Thermostats.....	45	51	22	Wheel Aligners.....	5	34	63
REPLACEMENT PARTS				Wheel Balancers.....	3	44	57
Good				Safety Testing Equipment.....	28	97	
Axle Shafts.....	5	84	66	Welding Equipment.....	7	23	74
Ball and Roller Bearings.....	70	40	20	Fair			
Brake Lining.....	63	37	4	TIRES	13	27	11
Bushings.....	12	71	24	Castings.....	11	32	18
Chains (Timing).....	3	49	34	Tubes.....			
Clutch Plates and Parts.....	77	76	4	Good			
Fan Belts.....	84	22	13	ELECTRICAL UNITS	34	70	17
Gaskets.....	95	52	8	Armatures.....	50	81	7
Gears (Rear Axle).....	9	70	47	Batteries.....	56	55	10
Gears (Transmission).....	7	67	36	Cable (Battery).....	46	46	18
Mufflers.....	103	46	7	Coils.....	57	80	17
Pistons.....	22	59	34	Other Ignition Parts.....	13	94	47
Pins.....	25	47	29	Fuses.....	55	27	11
Rings.....	85	26	5	Ignition Wire and Cables.....	67	41	20
Radiators and Cores.....	42	66		Lamps.....			
Spark Plugs.....	89	10	3				
Springs (Chassis).....	16	62	39				
Valves.....	40	49	54				
Water Pump Parts.....	60	70	10				
Engine Bearings.....	93	40	10				

MOST ACTIVE LINES

Position of Leaders	Mar. 1941	Mar. 1940	Apr. 1940	Position of Leaders	Mar. 1941	Mar. 1940	Apr. 1940
Mufflers.....	1	1	2	Brake Lining.....	11	12	11
Gaskets.....	2	2	3	Water pump parts...	12	14	19
Engine Bearings.....	3	3	1	Other ignition parts.....	13	13	13
Spark plugs.....	4	5	7	Battery cables.....	14	16	
Rings.....	5	4	4	Ignition wire & cables	15	17	18
Fan Belts.....	6	7	6	Batteries.....	16	..	..
Oil Filters.....	7	8	5	Coils.....	17	..	..
Clutch plates & parts.	8	6	8	Thermostats.....	18	..	..
Ball & Roller Bearings	9	9	12	Valves.....	19	..	20
Lamps.....	10	10	16	Seat covers.....	20	18	10

HOW ITEMS ARE RATED

"Most Active Lines" are chosen on the basis of the highest number of jobber reports indicating "Good" for the items selected among the twenty most active lines. "Activity" as used here has no bearing on volume, so the lists should not be interpreted as meaning the lines on which jobbers are enjoying the greatest volume. Most active lines are those which the greatest number of reporting wholesalers indicate are selling "considerably above normal" in their particular markets.

HOW TO READ THIS CHART

Information from which this chart is compiled is obtained monthly from a selected list of 500 wholesalers. Figures show the number of wholesalers reporting. Normal is taken as average sales for this month during the past few years.

Good—Sales considerably above normal.

Fair—Sales slightly above or below normal.

Poor—Sales noticeably below normal.

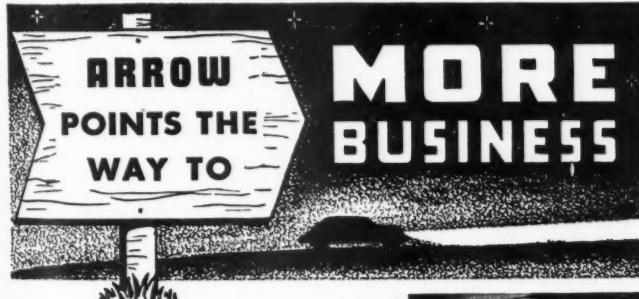


"He says the first steps in Spring tune-up are Gunk and Motor Fizik"

THE CURRAN CORPORATION

Manufacturing Chemists

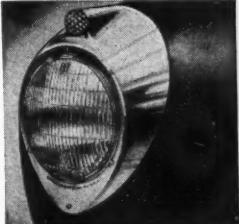
MALDEN, MASS.



Beauty and safety are two powerful factors that build sales. These ARROW units have both.

ARROW SEALED BEAM CONVERSIONS

Change old type of headlights to sealed beam units. They fit right into the old lamp housing of almost every car and model.



ARROW SEALED BEAM FOG LAMPS

do not deteriorate and cut down penetration. Greatly add to car's appearance. Choice of two body styles.

On an all year 'round schedule, ARROW is in LIFE magazine telling millions of readers about ARROW products. Order from your jobber or write us direct. P. O. Box 68.



ARROW SAFETY DEVICE CO., Inc.
MEDFORD, NEW JERSEY

EVERSEAL

REG. U. S. PAT. OFF.

HAND
PRESSURE
ONLY,
with

Everseal Auto Glass-Setting Material. No pounding, no breakage! Everseal swells, after setting, to form a *perfect seal* — the ideal stripping for ALL safety glass.



Recommended by

PITTSBURGH PLATE GLASS CO.

LIBBEY-OWENS-FORD GLASS CO.

AMERICAN WINDOW GLASS CO.

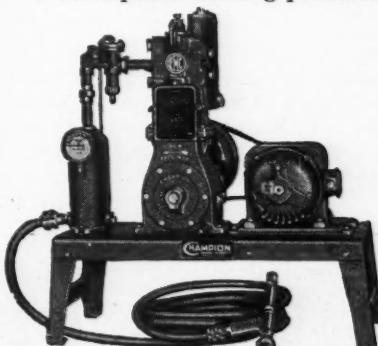
EVERSEAL PRODUCTS CO.

3822 HAZELWOOD AVE. • DETROIT, MICH.

WASHING
ANY
Elephants?



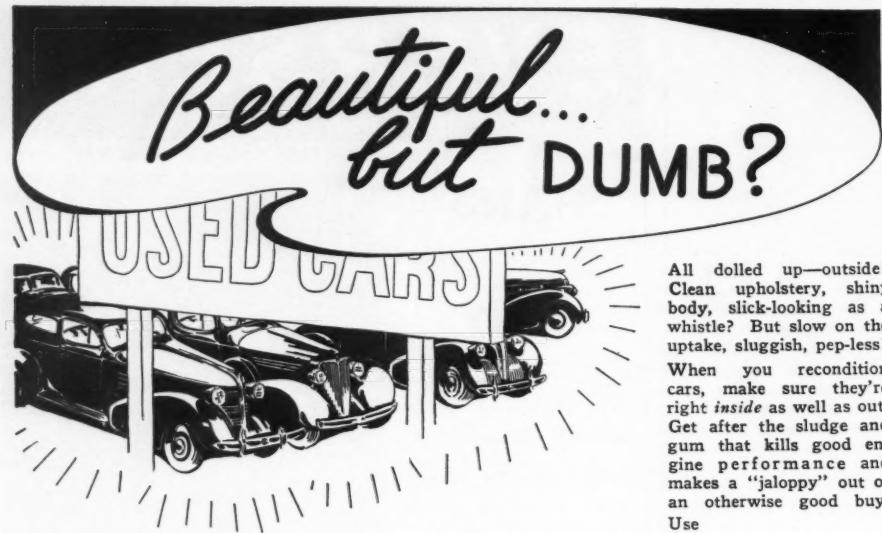
• Chances are you'll never have to "launder" any elephants. But—if you ever do, with this Champion H-1 on the job you won't fall over in a faint! For the H-1 has the capacity, operating efficiency and speed to make even elephant washing profitable!



H-1 CAR WASHER

Get the Car Washing Facts! Send Now for Free Booklet showing the REAL PROFITS IN CAR WASHING! Champion Pneumatic Machinery Co., 8192 South Chicago Ave., Chicago, Ill.





**DO YOU KNOW
ABOUT THE
OTHER MAGNUS
"RECONDI-
TIONERS"?**

Ask for a copy of the Magnus Automotive Cleaning Handbook to find out about the other Magnus aids in reconditioning used cars.



All dolled up—outside? Clean upholstery, shiny body, slick-looking as a whistle? But slow on the uptake, sluggish, pep-less? When you recondition cars, make sure they're right *inside* as well as out. Get after the sludge and gum that kills good engine performance and makes a "jalopy" out of an otherwise good buy. Use

MAGNUS METAFFIN

to clear out that sludge that plays hob with rings, valves and pistons, and with proper lubrication generally. You don't have to take the engine down. Just add Metaffin to the oil in the crankcase and idle the motor for a couple of hours. Then drain and replace with fresh oil. That's all, to remove harmful sludge—and you'll be surprised at the difference in engine performance. If you want to keep down sludge formation, just be sure that whenever you put oil in the crankcase, you add Metaffin also, in the proportion of $\frac{1}{2}$ pint per gallon of oil.

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.
36 South Avenue

Garwood, N. J.

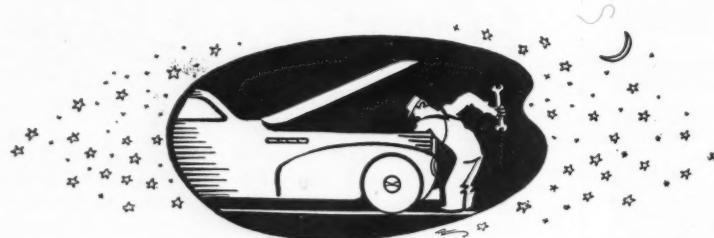
MAGNUS CLEANERS

SERVICE AFTER DARK

ONE evening a customer of the Claremont Garage, Detroit storage garage, complained to Harry Duffy, garage owner, about the lack of service facilities in the 50-car storage plant.

"My radiator is clogged up and has to be boiled out. It isn't bad, but it'll tie up my car all day and I can't get along without it. I wish I could get it fixed here overnight."

Duffy felt sorry for the customer,



and said so. He kept thinking on the matter as he sat in his office, then got an idea. Duffy knew a good mechanic who had a job, but who was having a pretty tough time financially. It was Friday night—perhaps the man wouldn't be working Saturday. He picked up the telephone and gave the man's number.

"Tom," he said, "I've got a darn good customer here who's got a clogged radiator. He can't part with his car during the day and would like to get it fixed tonight. I'd like to accommodate him. Know anything about that kind of a job? If you could come over and do something about it, I'll pay whatever it's worth—and be mighty grateful."

Tom came over, but it was found impossible to assemble the necessary materials that same night. The job could be done the next night, however. Duffy immediately phoned his customer and explained. Grateful for the interest Duffy had taken, the customer ordered the work done the next night.

Looking over the various cars parked on his floor, Duffy recalled other complaints he had heard owners voice in the preceding few days. One had a loose clutch, another was having difficulty starting almost every morning.

Over to the telephone Duffy phoned these owners. He had an expert repairman on the job for Saturday night, he explained, "just to fix things up for my customers who've been too busy to get the work done daytime!"

The response was immediate. Tom worked Saturday night, Sunday night—and there were still jobs to be done. Duffy persuaded Tom to take the job regularly, and continued going after business.

His first advertising venture was the printing of several hundred leaflets captioned: "We Work While You Sleep—and We Do a Darn Good Job, Too!"

The leaflet explained that solely for the convenience of motorists in the neighborhood an expert repairman had been added to the Claremont Garage for night service only. On the leaflet was an offer to call for the owner's car in the evening and return it—repaired, and guaranteed—at any specified hour in the morning. The result? Well, within three weeks, Duffy had to employ an assistant for Tom. And two weeks after that, it became necessary to put on a day man. He now has seven mechanics at

FOR THE OIL GASOLINE & WATER CONNECTIONS
VELLUMOID
VELLUMOID VELLUMOID

VELLUMOID GASKETS

VELLUMOID Gaskets make tight connections which stay tight. Stock them ready-cut, or make them as needed from Sheet VELLUMOID.

Sold through Jobbers. The Vellumoid Co., Worcester, Mass.

work—three on the day shift—four at night.

Advertising seemed to be the only answer, but Duffy made up his mind it would be "different" and "better" advertising. He compiled a mailing list personally, combing the city directory and telephone directory, which included every car owner he could find within a radius of approximately a mile of his garage. Then he prepared a letter, neatly mimeographed but personally signed in ink, and personally addressed. Instead of mailing the letter, Mr. Duffy employed two attractive young waitresses from a neighboring restaurant to deliver the letters. The young women were instructed to ring the door-bell, ask for the car owner, and then hand him or her the envelope with the simple statement: "Mr. Duffy wanted me to deliver this to you—he believes it will be of interest."

In that first letter, mailed a year ago, Duffy enclosed simply a business card. Results were so good that the letters are now sent out each two months, always with an enclosure the recipient is likely to keep for future reference. These enclosures, carrying the Duffy address, phone number and a brief message, have been such inexpensive items as pocket celluloid calendars, miniature house thermometers, bridge score pads, and the like.

There's another idea in the Duffy idea bag, too. Duffy is never content to deliver only the service the customer requests. Every car brought in for repair is carefully checked to ascertain its "repair needs." And it's Duffy's experience that 90 per cent of the cars in for service, need some additional service that hasn't been ordered. And this inspection is made as soon as the car comes in—before the ordered work is begun. Here's how it works:

An owner orders a clutch job. First inspection discloses a worn out fan belt, an oil filter that has gone unchanged for eighteen or twenty thousand miles, a broken gas gauge, or what have you. These "Inspector's Recommendations" are listed on a form and go into Duffy's office immediately. They contain not only what is needed, but exactly what the job will cost. Then Duffy picks up his phone. Diplomatic to the last degree, he merely calls the owner's attention to these needs, and inquires whether any should be taken care of "while the car is here."

The percentage of assets is surprisingly high.

Muthart Shifted

S. E. Muthart, formerly district manager of the Harrisburg Dodge truck territory has been promoted to regional truck manager of the Philadelphia region, it has been announced by L. D. Cosart, sales manager of the Dodge truck division.

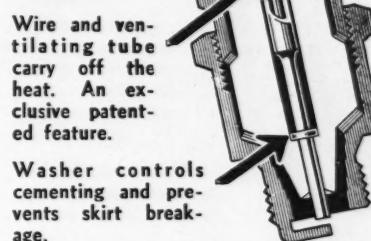


DIFFERENT! Revolutionary! A plug you can install with the assurance that it will give your customers *double satisfaction*—higher sparking efficiency and longer life at peak performance.

Leonard Spark Plugs are custom built—the most expensively made automotive plugs on the market today—yet they cost you and your customers no more!

SPARK PLUGS TO FIT "CHEVY"

Install the new Leonard "Special" to fit 14 mm. Chevrolet installations and stop insulation breakage and high speed miss. Now, for the first time, in Packaged Sets.



THE MOST COMPLETE PASSENGER CAR AND HEAVY DUTY LINE

If your Jobber can't supply you send us his name.

LEONARD SPARK PLUG CO., INC., NEWARK, N. J.

There's only One BURN-OUT PROOF DIRECTIONAL SIGNAL SWITCH and we make it!



In complete sets of
Signal-Stats or as a
replacement switch.
ASK YOUR JOBBER

Pat. Pend.

SIGNAL-STAT CORPORATION
68 JAY STREET
BROOKLYN, N. Y.

SPRING TONIC for PROFITS!



Thousands are cashing in with the
**CHAMPION
TIRE GROOVER**
You can, too. Write for details.
O. E. THOMPSON & SONS
535 River St. Ypsilanti, Michigan

SELL MORE SERVICE

with Exhaust Analysers

Be accurate — don't guess on
Motor Tune-Up. Use Engelhard
Precision Exhaust Analysers.
Sell more service by convincing
customers. Creates confidence.
Saves time—boosts profits.

Ask for Bulletin 601

CHARLES ENGELHARD, INC.

Builders of Precision Instruments for a Quarter Century

234 N. J. R. R. Avenue

Newark, N. J.

PAX

"BETTER PRODUCTS FOR BETTER RESULTS"

YOUR gasket jobs will be easier to handle when you use PAX PRODUCTS. And the results will be better. A strictly Quality line, based on scientific formulas. Made from highest grade materials. Yet Pax products "cost no more."

PAX GASKET CEMENT — Gaskets sealed with this cement stay sealed!

Permanently leakproof. Absolutely heat resistant. Doesn't burn out, flake or crumble.

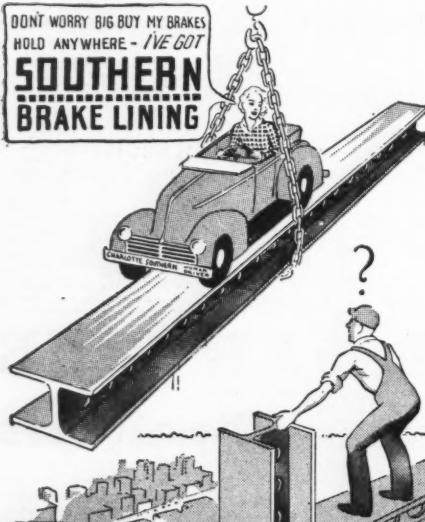


PAX GASKETMOLD—Different from every other gasket compound. For all metal-to-metal joints that call for an air-tight, leak-proof connection. Never sets hard. Withstands high temperatures. Not affected by gasoline, water or anti-freeze solutions.. May be substituted for a gasket.

Send Jobber's name if he can't supply you.

Territory open for live representatives.

JOHN S. MCKENZIE, Mfr. RUTHERFORD, N. J.



SOUTHERN
FRICTION MATERIALS CO. - CHARLOTTE, N.C.

ARO

VISI-FLUSHER
Model 78

TRIPLE YOUR GEAR-LUBE SALES
with this clean, quick, low-cost, 2-way (pressure-vacuum) gear flusher.
Ask Your ARO Jobber!

THE ARO EQUIPMENT CORP., BRYAN, OHIO

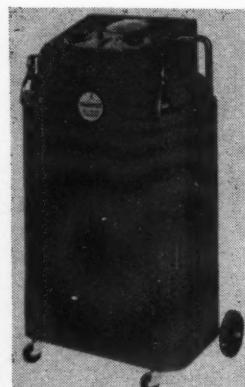
High-Powered Vacuum Cleaner

A self-contained vacuum cleaning unit known as the No. 95 Vackar, designed for both automotive and industrial use, has been placed on the market by the Black & Decker Mfg. Co., Towson, Md. A feature of the cleaner is a system of baffle plates and filters which adapts it to wet cleaning and to removing excess moisture after scrubbing upholstery and carpets. It is equipped with both inlet and outlet hose connections, allowing it to act as a blower as well as a cleaner. The unit is powered by a 1 hp. motor driving a 3-stage centrifugal fan, has a sealed vacuum pull of 65 in. and draws 60 cu. ft. of air per minute. It is mounted on ball-bearing swivel casters and comes complete with a 15-ft. flexible hose.



"Please send a man right away with enough air for two tires!"

Marquette Fast Charger



being offered by the Marquette Mfg. Co., Minneapolis, Minn. The charging rate is set by an eight-point, positive-

Mendall Metal

\$5 package does \$100 worth repair work \$25 clear profit easy

Unexcelled —

for permanent quick, inexpensive repairs, leaks, cracks, splits, holes in pipes, fittings—

Repairing cracked cylinder heads, motor blocks, water jackets, scored cylinder heads, cavities in rebores, etc. Sold on money back guarantee.

"6 bars for \$5.00 postpaid"
4A PRODUCTS CO., Denver, Colo.

Play Safe! Use Only



PURITAN
The Genuine REFILL
BRAKE FLUID

Mixes with ALL Others

Distributed through N. A. P. A. Warehouses

BOTH You and Your Customers PROFIT with FEL-PRO GASKETS!



Exclusive Fel-Pro soft-faced construction seals without distortion—insures customer satisfaction. Packaged in boxes and sets for easy handling and less labor costs.

Write for Complete Gasket Catalog! **FELT PRODUCTS MFG. CO.**
1510 N. Carroll Ave., Chicago, Ill.

Half Million Miles' Use Wins Fleet's Praise for

TELEOPTIC DIRECTIONAL SIGNALS

• Write for Details •

The Teleoptic Co.
Racine, Wis.

TAPERED ROLLER BEARINGS

Tyson

ROLLER BEARING CORP.

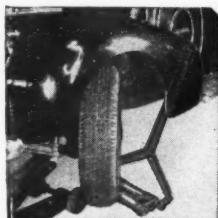
MASSILLON, OHIO

THREE PROFITABLE INVESTMENTS

MODERN FENDERS DEMAND IT

**THE H-289
PERFECTION
POWER-PLUS
UNIVERSAL
FENDER
SPREADER**

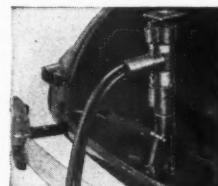
for close work where wide spreading is necessary and for spreading between fender and fender well. Pays for itself on the first six jobs. Closes to $1\frac{1}{4}$ " and opens to $1\frac{3}{4}$ " with 6" ram travel. \$14.75.



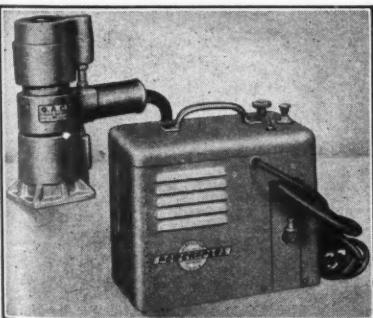
POWER IN A SMALL AREA

**H-80
PERFECTION
POWER-PLUS
PUSH-PULL
SPREADER**

For use with Perfection Push-Pull Jack. Ideal for trunks, pushing out sills, etc. Fits into 1" space. Open width $5\frac{1}{2}$ ". \$8.50.



Announcing ...



AUTOMATIC TWO-SPEED TWIN-CYLINDER POWER UNIT

Two high-speed pumps quickly force ram to contact load, then automatically cut out and powerful slower speed pumps lift load. Two cylinders working at all times give continuous uninterrupted flow of power to ram.

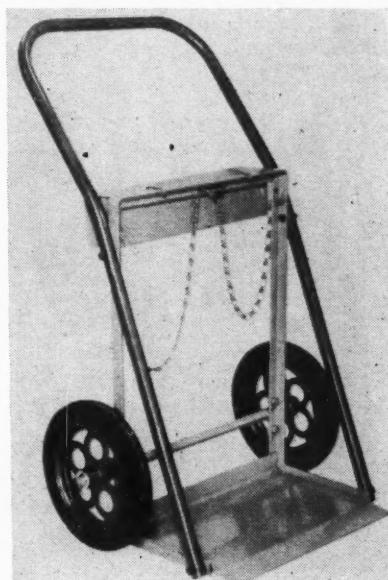
Order from your jobber or write for catalog.

**G. A. C. Mfg. Co.
ASHLAND, OHIO**

contact, ampere-selector switch, while a clock controls the charging period. A circuit breaking, main control switch kicks out if wrong connections are made, or if overloads occur. The unit is mounted on rubber wheels and occupies only $1\frac{1}{2}$ sq. ft. of floor space.

Hand Truck for Welding

The Linde Air Products Co., 30 East 42nd St., New York City, has just announced a new hand truck to carry an oxygen cylinder, an acetylene cylinder, and a complete welding and cutting outfit. This new truck is well balanced and has 14 in. semi-pneumatic rubber tires. It is known as the Oxweld T-7 two-wheel welding truck.



MAKE MONEY ON TUNE-UP with "KING" Testers



This is TUNE-UP time! Why not give some thought to increasing your tune-up business? Hundreds of Repair Shops, with the aid of "KING" Testers, are making good profits from tune-up. Many have sold their customers on having a tune-up at regular intervals. The "KING" Line is large and complete with a wide price range—can supply the right Tester for any shop. The "KING" K-400 Unit Tester has the following five units which may be purchased separately: (1) Motor and Ignition Tester; (2) Generator Voltage Regulator Tester; (3) All Electric Spark Plug Tester; (4) New oscillator type Condenser Tester; (5) Exhaust Gas Analyzer with vacuum and fuel pump test.

"KING" Distributor Drive

The "KING" Distributor Tester D-3 includes a Cam Dwell Meter and a 3-jaw universal chuck. It enables you to test distributors under actual driving conditions. It uses a standard coil and

6-volt battery and operates on the stroboscopic principle. The Cam Dwell Meter offers the only positive method of setting breaker points; it has a built-in coil and concealed wiring. Only one connecting wire is necessary, and a simple throw-over switch is also provided to show governor action on the stroboscopic disc.

"KING" R.P.M. Indicator \$42.50

Every shop should have the "KING" Electro-Tach (or R.P.M. Indicator) because of its outstanding performance. It simplifies timing of the ignition and carburetor adjusting, is used for testing engine balance, and has many other uses. All meter wavering has been overcome by taking the more rapid impulses from the primary of coil or distributor instead of spark plug. It requires no balancing or disconnecting of wires. Operates from a 6-volt battery.

Ask our Jobber or Write us Jobber's Name
**C. E. ELECTRIC HEAT CONTROL CO.
9123 INMAN AVE., CLEVELAND, OHIO**
KING Good Products Since 1914 KING



"There's a ten spot in it if you can sell the boss one, Mister!"

Extra Profits



in these
Fast-Selling

KREGER

Genuine Quality
As Certified by the Original Part

Parts

Your satisfaction is guaranteed when you buy any of the 200 Kreger Genuine Quality products. Here are just a few of my popular numbers. Send coupon for introductory 50% discounts.

Larry Kreger

You'll Sell lots of these - -



BATTERY HOLD-DOWNS

Needed by most cars. You can sell one with almost every battery you service. Get the extra business—extra profits—with these genuine quality Hold-Downs. Only 6 numbers for all cars.

List

No. 205 for Ford.....	\$0.50
No. 205-B for Buick.....	.75
No. 205-C for Chevrolet.....	.70
No. 205-P for Plymouth (15 plate).....	.65
No. 205-X for Plymouth (17 plate).....	.65
No. 205-Y Universal.....	.65



BATTERY SUB-TRAYS

Improved extra heavy welded construction—with acid resisting enamel finish. It is typical of the genuine quality built into all Kreger products.

List

No. 205-K (7 3/16" x 9 1/8"—end straps)....	\$0.50
No. 205-L (7 3/16" x 10 5/8"—side straps)....	.60
No. 205-M (7 3/16" x 10 5/8"—end straps)....	.60

You'll Need These--



SAFE-TEE GRIP BATTERY CARRIER

This is the new SAFE-TEE GRIP battery carrier you've been waiting for. Can't slip loose—positive grip on all posts. Extra heavy acid resisting construction—nothing finer.

List

No. 205-H—12"	\$0.50
No. 205-J—20" .....	.75



Improved OVERSIZE Battery Post SHIMS

The perfect battery post shim. Extra heavy—.030" pure lead for perfect contact. Fits all posts.

No. 205-F—box of 50.....List \$0.50

Larry Kreger, The L. F. Kreger Mfg. Company
544 W. 35th Street, Chicago, Illinois

Send me the following at once at your special introductory net price of 50% off list delivered:

<input type="checkbox"/> No. 205	<input type="checkbox"/> No. 205-P	<input type="checkbox"/> No. 205-Y
<input type="checkbox"/> No. 205-B	<input type="checkbox"/> No. 205-K	<input type="checkbox"/> No. 205-M
<input type="checkbox"/> No. 205-C	<input type="checkbox"/> No. 205-X	<input type="checkbox"/> No. 205-F
<input type="checkbox"/> No. 205-J	<input type="checkbox"/> No. 205-L	<input type="checkbox"/> No. 205-H

Name

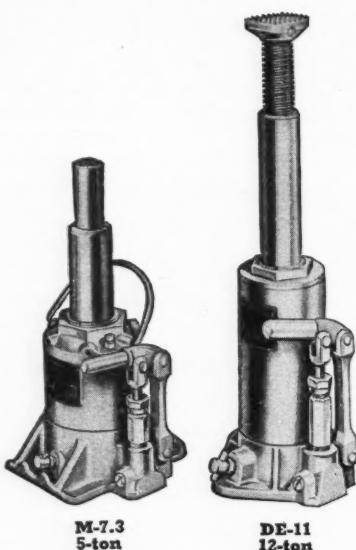
Jobber's Name

Address

City

New Jacks by Blackhawk

The Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee, Wis., has recently announced two new hydraulic jacks. Model M-7.3 has a capacity of 5 tons and has a low height of 7-5/16 in., with a double telescopic lift providing a full 14 1/2 in. total height. The Model DE-11 has a 12-ton capacity and is designed for lifting high-axle truck and load. It has a 11 in. collapsed high, 6 1/2 in. hydraulic lift and



a screw extension of 3 1/2 in., giving a total extended height of 21 in. Model M-7.3 is priced at \$23; the DE-11 at \$23.50—slightly higher on the West Coast and in Canada.

Motor Rythm in New Size

Announcement of a new 4-oz. can of Motor Rythm has been made by R. M. Hollingshead Corp., Camden, N. J. This is designed for convenience, as this is the amount said to be correct for adding to 5 gallons of gas. Packaged in this manner, and displayed at the pump island, it provides a ready sale when selling gas. The display stand and a quantity of merchandising helps are supplied free with a special assortment of Motor Rythm.

Streamlined Balance Weights

The Harley C. Loney Co., 16883 Wyoming Ave., Detroit, Mich., has announced a new designed wheel balance weight to fit all wheels, including those with the new wide base rims. Pressure-molded, the new style weight has an exceptionally smooth surface, and is so designed that it clears the brake backing plates on the inside of the rim and the trim rings on the outside. Easy to install and remove.

Clean as a Rifle Barrel!

RIMAC VALVE GUIDE BRUSHES

A few up and down strokes—and every trace of carbon is removed with Rimac Valve Guide Brushes. No scratching. One handle with solid steel shank takes all sizes. Only 5 sizes fit 90% of all cars and trucks. SET No. HB-5, net \$2.25.

RINCK-MCILWAIN, INC.
16 HUDSON ST., NEW YORK, N. Y.



Send for
Rimac Catalog

SPEAKER MATCH PATCHES

You make more friends, higher profits, with Speaker "MATCH PATCH". Guaranteed TUBE REPAIRS. Unsurpassed in Quality and Performance. Hermetically sealed in patented MOISTURE-PROOF PLIOFILM. Instant lighting Wick Fuse. Fit any clamp. Box of 50's—\$1.45. Order from your Jobber TODAY!

J. W. SPEAKER CORPORATION
1661 North Water Street
Milwaukee, Wisconsin



Handy SUPER SERVICER

Quick Charger

Compact portable Tester, Booster and Quick Charger. Tests battery in 1 min. Charges FAST and SAFELY in car. Specify 115 or 230 volts when ordering.

Complete with Bulbs, Leads and Clips \$180.00

BALDOR ELECTRIC CO.
4375 Duncan Ave.,
ST. LOUIS, MO.



TRADE MARK
NOC-OUT
HOSE CLAMPS
WITH THE
THUMB SCREW

For fast, dependable hose connections, use NOC-OUT Hose Clamps . . . standard in the automotive industry for many years for their leakproof, trouble-free sealing features. Quick tightening thumb screw provides equal pressure all around. Type "A" Adjustable . . . fits many hose sizes. Type GBB heavy duty, solid band for Booster Brakes. GSHH for all heater hose. Type HP for all high pressure air and gas lines. Sold by dealers and jobbers everywhere.

WITTEK MFG. CO.
4305 W. 24th PL., CHICAGO U.S.A.

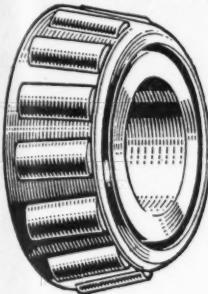
CLASSIFIED ADS

WELDING OUTFITS \$29.73 to \$76.06. Electric Arc Welders \$155.00 to \$225.00. Superior Oxy-Acetylene Co., Dept. O, Hamilton, Ohio.

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SpeedWay Mfg. Co., 1280 S. 52nd Ave., Cicero, Ill.

Named by AP Parts

Lea O. Graves was recently appointed to cover Northern California; Frank Acton to cover Southern California; and J. T. Hundley to cover southern Ohio, southern Indiana and Kentucky—all as territory representatives for The AP Parts Corp., according to an announcement made by W. E. Bullock, vice-president in charge of sales.

O. Ansley Roeger and Carl A. Kemritz have been added to the sales department of AP with headquarters at Toledo, Ohio.

Altimeter for Autos

A new device for motorists known as the Auto-Altimeter has been developed by the Taylor Instrument Co., Rochester, N. Y. Similar to that found in aircraft, the mechanism is enclosed in a brown plastic case and is fitted with a metal bracket for mounting in the most convenient place. Available in three models, the unit is furnished with the large, easily read dial marked off in 100 ft. divisions on two of the models and 200 ft. divisions on the third. Setting is accomplished by means of an exterior arm at the top.

WELDERS, ATTENTION!

When the plastic window in your welding helmet becomes scratched and cloudy, don't throw it away. Just polish it on your buffing wheel, using the softest wheel you have and the polish you use for headlight reflectors. Polish both sides of the plastic window, and it will clean up as good as new. *Ivo Pennington, Wauneta, Nebraska.*



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